

>>CHRISTY JOHNSON-HUGHES:
HELLO AND WELCOME TO THE U.S.
FISH AND WILDLIFE SERVICE WIND
ENERGY BROADCASTS I AM CHRISTY
JOHNSON-HUGHES OF THE U.S. FISH
AND WILDLIFE SERVICE AND WE ARE
COMING TO YOU FROM THE NATIONAL
CONSERVATION TRAINING CENTER
STUDIO IN SHEPHERDSTOWN, WEST
VIRGINIA.

AS MANY OF YOU KNOW, WE HAVE
BEEN DOING A SERIES OF
BROADCAST AND FOR THOSE OF YOU
WHO HAVE JOINED US IN THE PAST,
WE ACCEPT QUESTIONS AND
COMMENTS IN THE CHAT FEATURE OF
THE BROADCAST, AND YOU WILL SEE
THAT JUST TO THE SIDE OF YOUR
SCREEN SO ANY TIME DURING THIS
BROADCAST, FEEL FREE TO TYPE IN
YOUR QUESTION OR COMMENT AND
WE WILL HOLD A QUESTION AND
ANSWER SESSION AND BE ABLE TO
GET BACK TO SOME OF YOUR
QUESTIONS.

WE WILL BE HANDLING THAT LATER
ON IN THIS BROADCAST.

WHAT I WOULD LIKE TO DO TODAY IS
TALK ABOUT THE NEXT PHASE OF THE
TIERED APPROACH AND WE HAVE
SEVERAL GUESTS WITH US WHO WILL
HELP US TALK ABOUT THE REALITIES
OF DOING POST- CONSTRUCTION
STUDIES.

JUST AS A QUICK REFRESHER, LET'S
TALK ABOUT THE TIERED APPROACH
AND WHERE WE HAVE BEEN.

I HAVE A PRESENTATION, A FEW
SLIDES TO SHARE WITH YOU TODAY
ON TIER 4 POST- CONSTRUCTION
STUDIES TO ESTIMATE IMPACTS.
AND WHERE ARE WE IN THE TIERED
APPROACH.

WE STARTED OUR BROADCAST
TALKING ABOUT TIERS ONE AND TWO

WHICH IS SITE ASSESSMENT AND CHARACTERIZATION.

MAKING SURE YOU FIND THE BEST POSSIBLE FIGHT WITH THE LOWEST AMOUNT OF RISK.

AND IN OUR SECOND BROADCAST, WE TALKED ABOUT PRECONSTRUCTION STUDIES.

WHAT DO WE NEED TO LOOK FOR BEFORE WE GET INTO ACTUAL CONSTRUCTION OF THE FACILITY AT MUCH LESS OPERATION OF THE FACILITY SO TODAY WHAT WE WOULD LIKE TO DO IS TALK ABOUT POST- CONSTRUCTION STUDIES.

THOSE STUDIES THAT CAN BE DONE AFTER THE FACILITY IS ACTUALLY UP AND OPERATING.

IN POST- CONSTRUCTION STUDIES WE HAVE TO ASSESS SEVERAL THINGS. SECTIONS OF FATALITY RISK AND THE DIRECT AND INDIRECT IMPACTS TO HABITAT AND ESSENTIALLY MAKE SURE THAT OUR PREDICTIONS ARE ON TRACK.

WE HAVE TWO SETS OF FIELD STUDIES, TIER 4 8 WHICH ARE FATALITY STUDIES WHICH MOST EQUAL ARE FAMILIAR WITH AND TIER 4 B. WHICH ARE ASSESSING THE DIRECT AND INDIRECT IMPACTS TO HABITAT.

IT'S PARTICULARLY IMPORTANT THAT WE DON'T HAVE THAT CONCEPT LOST.

TIER 4 A FATALITY STUDIES REALLY ARE DESIGNED TO MAKE SURE THAT OUR ESTIMATES THAT WE DEVELOPED DURING TIERS ONE, TWO, THREE ARE FOLLOWING WHAT WE ANTICIPATED TO HAPPEN, THAT THE SITE IS NOT EXPERIENCING ANY ADDITIONAL TAKE OF SPECIES THAT THE SPECIES THAT ARE BEING TAKEN ARE THOSE THAT WE ANTICIPATED AND THAT THERE IS NOTHING

BEYOND WHAT WE ANTICIPATED SO IN ORDER TO DO THAT THE WIND ENERGY GUIDELINES ASK THAT YOU COLLECT A MINIMUM OF ONE-YEAR FATALITY INFORMATION OVER ALL SEASONS.

WE REALIZE THAT THIS IS JUST A MINIMUM, A STARTING POINT AND ADDITIONAL TIME IT MAY BE APPROPRIATE FOR HIGH RISK SITES IN THIS INCLUDES CARCASS REMOVAL AND WHETHER WE CAN EVEN DETECT THESE CARCASSES OUT THERE.

AS WE'VE DISCUSSED IN THE PACT, YOU'RE PROBABLY FAMILIAR WITH WITH SOME OF YOUR SITES OR IN READING THE RESEARCH A TINY BAT THAT FALLS ON GRAVEL MAY BE EASIER TO DETECT THAN A TINY BAT THAT FALLS INTO A FIELD WITH TALL GRASS.

WE HAVE DISCUSSED SOME OF THESE ISSUES IN THE PRECONSTRUCTION CONTEXT.

HERE WE ARE TALKING ABOUT THE POST-CONSTRUCTION CONTEXT.

WE HAVE A GUEST HERE TODAY WHO WILL TALK TO US A LITTLE BIT MORE ABOUT FATALITY ESTIMATES AND HOW TO REALLY UNDERSTAND THOSE ESTIMATES WHEN YOU TAKE A LOOK AT THE REPORT OR CONSIDER PERFORMING THOSE ESTIMATES.

WE ALSO HAVE TIER 4 B. THIS IS THE DIRECT CONSIDERATION IN THESE STUDIES MAY NOT ALWAYS BE WARRANTED BUT IF YOU HAVE A SPECIES OF HABITAT FRAGMENTATION CONCERN AND THAT SPECIES HAS BEEN IDENTIFIED AND MAY BE AT RISK FOR THIS PARTICULAR PROJECT THAT YOU MAY BE INVOLVED WITH, THEN YOU MAY BE DOING DIRECT AND INDIRECT HABITAT IMPACT STUDIES.

AGAIN IT FOLLOWS THE SAME SORT OF TRAJECTORY AS OUR FATALITY ESTIMATES.

THE HABITAT IMPACTS, WERE THEY COMPARABLE WITH WHAT WE ANTICIPATED DURING THE INITIAL TIERS.

OR ARE WE SEEING BEHAVIORAL MODIFICATIONS OR INDIRECT HABITAT IMPACTS THAT WE DID NOT ANTICIPATE?

IS THERE AN OPPORTUNITY FOR MITIGATION?

AND IF MITIGATION HAD BEEN CONSIDERED PREVIOUSLY, AND WE HAVE TALKED ABOUT USING MITIGATION, AND MITIGATION IN TIER 3 PRECONSTRUCTION STUDIES, THEN IS THAT MITIGATION IS BEING USED, IS IT DOING WHAT WE NEED IT TO DO OR DO WE NEED TO TAKE ANOTHER LOOK AT IT AND SEE IF PERHAPS THERE MIGHT BE SOME MODIFICATIONS THAT WOULD BE NEEDED AT THIS TIME.

SO IN SUMMARY, TIER 4 STUDIES ARE MONITORING FATALITIES AND HABITAT IMPACTS AFTER THE CONSTRUCTION AND OPERATION OF A FACILITY, WHERE THOSE PREDICTIONS WE MADE IN EARLIER TIERS CORRECT, AND ALSO KEEPING IN MIND WE HAVE TALKED ABOUT TIER FIVE LONG-TERM RESEARCH THAT CAN BE DONE WHICH IS NOT DONE AT EVERY FACILITY, BUT IT CAN BE PART OF TIER 4 STUDIES SO IT'S A FACILITY HAS DECIDED TO DO TIER FIVE RESEARCH STUDIES, THE TIER 4 MIGHT BE PART OF THAT.

AND THROUGH THIS ENTIRE PROCESS, COMMUNICATION IS KEY.

IT DOES NOT STOP ONCE THE FACILITY IS BUILT.

WE NEED TO CONTINUE

COMMUNICATING AFTER OPERATION,
PARTICULARLY IF SOMETHING GOES
AWRY OR SOMETHING HAPPENS THAT
WE NEVER ANTICIPATED.

THAT IS SORT OF A SUMMARY OF
WHERE WE HAVE BEEN AND WHERE
WE ARE IN THE TIERED APPROACH.
WHAT I WOULD LIKE TO DO NOW IS
INTRODUCE OUR FIRST GUEST WHO
WILL TALK TO US ABOUT FATALITY
ESTIMATORS.

OUR FIRST GUEST TODAY IS MANUELA
FROM THE US GEOLOGICAL SURVEY.
AND MANUELA IS A RESEARCH
STATISTICIAN WITH THE USGS
FOREST AND RAIN ECOSYSTEM IN
OREGON ON.

SHE HAS BEEN INVOLVED IN DESIGN
AND AMOUNT -- ANALYSIS OF
POST- CONSTRUCTION FATALITY
MONITORING STUDIES AS WELL AS
CURTAILMENT STUDIES AT SEVERAL
WIND POWER FACILITY SINCE 2004.
HER RECENT STATISTICAL RESEARCH
HAS FOCUSED ON DEVELOPING
ESTIMATORS OF FATALITIES
PARTICULARLY OF RARE AND
ENDANGERED SPECIES.

LET'S GO AHEAD AND GO TO
MANUELA.

>>MANUELA HUSO: THANK YOU,
CHRISTIE FOR INVITING ME TO COME
AND TALK TO YOU TODAY ABOUT
ESTIMATING FATALITIES AS PART OF
THE FISH AND WILDLIFE SERVICE
GUIDELINES TIER 4 ANALYSIS
APPROACH.

AND THANK YOU FOR YOUR INTEREST
IN THIS TOPIC.

ONCE I'VE GIVEN YOU A BRIEF
INTRODUCTION TO THE
CONSIDERATIONS WE HAVE IN
ESTIMATING FATALITIES WE WILL GIVE
YOU A CHANCE TO ASK QUESTIONS
OF US.

FIRST, I WOULD LIKE TO ASK, MOST OF US WOULD NOT BE HERE IF ESTIMATING FATALITIES WAS EASY. YOU MIGHT SAY ISN'T IT THE SAME AS ESTIMATING THE ABUNDANCE OF A POPULATION WHICH WE ARE ALL PRETTY WELL USED TO EVEN THOUGH IT'S A DEAD POPULATION. IN SOME WAYS THAT'S TRUE, BUT IN OTHER WAYS THERE ARE UNIQUE CONDITIONS THAT MAKE IT DIFFERENT THAN SIMPLY ESTIMATING ABUNDANCE.

WE HAVE AN OPEN POPULATION IN WHICH CARCASSES CAN LEAVE AND ENTER AT ANY TIME.

WE HAVE A SUPER POPULATION WHERE WHAT WE ARE INTERESTED IN ESTIMATING IS NOT WHAT THE ABUNDANCE IS AT A PARTICULAR MOMENT LIKE IT MIGHT BE FOR A DEER POPULATION AND WE ARE INTERESTED IN ESTIMATING THE SUPER POPULATION.

THE DENSITY OF OUR POPULATION IS NOT CONSTANT AND IN FACT, THE POPULATION ITSELF IS NOT HOMOGENEOUS.

WE HAVE VERY DIFFERENT SIZES OF BIRDS AND BATS THAT ARE ARRIVING IN SO BECAUSE OF THAT WE HAVE VERY DIFFERENT PROBABILITIES OF DETECTIONS WITH MEMBERS OF OUR POPULATION.

AND THE DIFFERENT SPECIES THEMSELVES ENTER AND LEAVE AT DIFFERENT RATES.

ALL OF THESE THINGS COMBINE TO MAKE ESTIMATING FATALITY AT WIND TURBINES A BIT PROBLEMATIC.

THE TIER 4 GUIDELINES SUGGEST THAT WHEN WE ARE DEVELOPING OUR PROTOCOL TO ESTIMATE FATALITY, WE SHOULD KEEP IN MIND THAT WE NEED TO -- THE PROTOCOL

SHOULD BE ADEQUATE TO ANSWER
APPLICABLE TIER 4 QUESTIONS AT AN
APPROPRIATE LEVEL OF PRECISION.

THAT APPROPRIATE LEVEL OF
PRECISION IS VERY IMPORTANT.

WHAT WE WILL DO TODAY IS
EXAMINED THE TIER 4 PROTOCOL
DESIGN CONSIDERATIONS LISTED
KEEPING IN MIND THE CONTEXT OF
THE TIER 4 OBJECTIVES.

AS WE GO THROUGH THIS, I WOULD
LIKE YOU TO KEEP IN MIND OR ASK
YOURSELF, WHICH QUESTIONS ARE
RELEVANT TO YOUR PARTICULAR
SITE?

WHAT LEVEL OF PRECISION DO YOU
NEED?

HOW CAN YOU ARRIVE AT THAT
LEVEL?

THESE ARE THE TIER 4 QUESTIONS.
BUT TODAY WE ARE NOT GOING TO
FOCUS ON ALL OF THEM BECAUSE IF
WE FOCUS ON JUST THE FIRST ONE,
MUCH OF WHAT WE GO THROUGH
AND TALK ABOUT TODAY WILL BE
APPLICABLE TO ALL THE REST AND
WE WILL SEE THAT.

SO JUST TO SET THE STAGE, WE ALL
ARE PRETTY WELL AWARE THAT
WHAT WE SEE WHEN WE ARE
SEARCHING FOR CARCASSES BELOW
TURBINES IS NOT WHAT ACTUALLY
PROBABLY DIED OUT THERE.

THE REASON IT IS NOT IS FIRST OF
ALL, WE DON'T SEARCH ALL OF THE
TURBINES.

WE ONLY SEARCH A SAMPLE OF THE
TURBINES.

NOT ALWAYS BUT SOMETIMES.

CARCASSES MAY FALL OUTSIDE OUR
DESIGNATED SEARCH PLOT WHICH IS
THE RECTANGLE REPRESENTED IN
THE SCHEMATIC, BUT THEY ALSO MAY
FALL WITHIN OUR SEARCH PLOT, BUT
IN AREAS THAT ARE INACCESSIBLE TO

US SO WE CAN'T FIND THEM BECAUSE WE CAN'T SEARCH THEM.

SOME CARCASSES ARE REMOVED BY SCAVENGERS AND, OF COURSE, SOME ARE SIMPLY MISSED BY CHANCE BY THE SEARCHING PROCESS.

SO THE CONSIDERATIONS THAT THE GUIDELINES SET OUT ALL ADDRESS IN ONE WAY OR ANOTHER, ARE FACTORS THAT ALL CONTRIBUTE TO IMPERFECT DETECTION.

WE WILL GO THROUGH EACH OF THESE ONE BY ONE.

FIRST, WE WILL START WITH THE DURATION OF THE MONITORING.

THE DURATION REALLY NEEDS TO SIMPLY REFLECT YOUR PERIOD OF INTEREST.

IF IT'S A YEAR, YOU NEED TO MONITOR FOR YEAR IF IT'S A SEASON, YOU NEED TO MONITOR FOR A SEASON.

THE FREQUENCY WITH WHICH YOU MONITOR, THAT IS THE SEARCH INTERVAL DURING PERIOD WHAT CAN VERY.

IT IS AND SHOULD BE TRIED -- TIED TO THE REMOVAL PROCESS AND THE PERSISTENT TIME OF THE CARCASSES NOT THE ARRIVAL TIME EVEN THOUGH YOU MIGHT GET MORE CARCASSES OR MORE ANIMALS ARRIVING IN THE CARCASS POPULATION DURING A PARTICULAR PERIOD OF TIME, SAY A FALL SEASON, THAT DOES NOT NECESSARILY MEAN YOU NEED TO SHORTEN YOUR INTERVAL.

IT WOULD BE NECESSARY TO SHORTEN THE INTERVAL IF THE CARCASS PERSISTENCE ALSO IS REDUCED DURING THAT PERIOD.

IT IS EXTREMELY RARE AT THE TIER 4 LEVEL FOR US TO NEED DAILY

SEARCHES TURBINES.
THERE IS A HIGH COST TO THAT.
IF WE CAN AVOID DAILY SEARCHES
IT'S BEST AND IT'S OFTEN JUST FINE.
THAT SHOULD BE RESERVED FOR THE
TIER FIVE PROCESS, FOR RESEARCH.
SO ULTIMATELY, THE SEARCH
INTERVAL WE USE IS REALLY A
TRADE-OFF BETWEEN THE NUMBER
OF TURBINES WE CAN SEARCH
VERSUS THE SEARCH INTERVAL.
SO NOW WE GO TO THE SECOND
FACTOR WHICH IS THE NUMBER OF
TURBINES TO MONITOR.
IN AFFECTED IS NOT REALLY NOT THE
NUMBER WE ARE INTERESTED IN BUT
THE SAMPLING FRACTION OF THE
PROPORTION THAT WE ARE
SAMPLING.
THIS IS A FACTOR OVER WHICH WE
HAVE A LOT OF CONTROL.
SO CONSEQUENTLY IT IS VERY
IMPORTANT IN OUR PROJECT DESIGN.
IF WE HAVE LESS THAN TEN
TURBINES AT A SITE, GUIDELINES
SUGGEST WE SEARCH 100 PERCENT
OF THEM, ALL OF THEM.
IF WITH MORE THAN TEN, MY
SUGGESTION IS RESEARCH AS MANY
AS POSSIBLE.
THAT'S A PRIMARY SOURCE OF
VARIATION WE ARE INTERESTED IN
HIM BEING ABLE TO MEASURE.
FOR EXAMPLE, IF WE HAVE THE
MONEY TO SEARCH HALF THE
TURBINES DAILY, MY SUGGESTION IS
WE ACTUALLY APPLY THAT MONEY TO
SEARCHING ALL OF THE TURBINES ON
A TWO-DAY BASIS THAT IS, OF
COURSE, WITH THE CAVEAT THAT THE
PERSISTENCE TIME IS EXTREMELY
LOW LIKE ONE DAY THEN MAYBE
THAT'S NOT ADEQUATE, BUT FOR
MOST OF OUR SITES IN THE
CONTINENTAL U.S. THAT I'M AWARE

OF, A TWO-DAY SEARCH OR A ONE-DAY SEARCH IS CERTAINLY NOT NECESSARY.

THE NEXT CONSIDERATION IS THE BIAS AND ERROR A ASSESSMENT WHICH COMES DOWN TO SEARCHER EFFICIENCY AND THE PERSISTENCE OF A CARCASS.

BOTH OF THESE HAVE SIMILAR KINDS OF THINGS ONE NEEDS TO THINK ABOUT.

WE NEED TO FIRST OF ALL IDENTIFY AS RESEARCHERS OR MONITORS THE FACTORS THAT WE THINK COULD SIGNIFICANTLY AFFECT THESE THINGS.

THESE ARE TYPICALLY THINGS LIKE THE HABITAT IN WHICH WE ARE SEARCHING OR WHICH THE CARCASS GLANCE, THE SIZE OF THE TARGET, THE SEASON, PARTICULARLY FOR CARCASS PERSISTENCE AS THE CARCASS SCAVENGER POPULATION MAY CHANGE WITH THE SEASONS.

ONCE WE'VE IDENTIFY THESE FACTORS, WE NEED TO REALIZE WE WILL NEED MANY CARCASSES IN EACH OF THE FACTOR COMBINATIONS IN ORDER TO BE ABLE TO RUN TRIALS TO ESTIMATE THE LEVELS OF THESE FACTORS.

I WOULD SUGGEST THAT WE TARGET ABOUT 20 FOR EACH COMBINATION. HOWEVER, IF FOR EXAMPLE, ONE OF YOUR COMBINATIONS IS EXPECTED TO BE RELATIVELY SMALL, SAY A SMALL CARCASS IN A VERY DIFFICULT TO SEARCH HABITAT, THEN YOU PROBABLY NEED A LOT MORE.

IN THIS EXAMPLE, WE HAVE THREE SIZES OF CARCASSES, THREE HABITAT TYPES THAT RESULTS IN NINE DIFFERENT FACTOR COMBINATION EACH OF WHICH REQUIRES ABOUT 20 SO WE ARE

LOOKING AT 180 CARCASSES FOR
THIS ESTIMATION PROCESS.
THIS IS PRETTY MUCH THE SAME IDEA
FOR CARCASS PERSISTENCE AS
WELL.

WE WANT TO DISTRIBUTE THE
CARCASS THROUGHOUT THE PERIOD
OF INTEREST, NOT JUST ON ONE DAY
OR ONE TURBINE.

NOW I WILL FOCUS FOR A LITTLE BIT
ON THE SEARCHER EFFICIENCY
COMPONENT.

IN SOME PLACES I'VE SEEN THAT
PEOPLE REQUIRE TIME LIMITED
SEARCHES.

IN ALL OF THE ESTIMATION PROCESS
THAT WE USE, THE TIME INTERVAL IS
NOT ACTUALLY PART OF THE
PROCESS.

IT IS NATURAL AND MAYBE EVEN
ACTUALLY ADVANTAGEOUS FOR US
TO SLOW DOWN WHEN WE ARE IN
DIFFICULT TO SEARCH HABITATS.
IT IS ALSO MEANINGFUL OR USEFUL
TO NARROW OUR SEARCH TRANSECT
WHEN WE ARE IN DIFFICULT
HABITATS.

WHAT IS IMPORTANT IS NOT THAT THE
TIME IS CONSTANT OR THE TRANSECT
IS CONSTANT, WHAT IS IMPORTANT IS
THE PROCESS YOU USE FOR THE
ACTUAL SEARCHES IS EXACTLY OR IS
THE SAME PROCESS AS IS USED
WHEN THE SEARCHERS ARE BEING
TESTED.

IF THEY SLOWDOWN IN DIFFICULT
HABITATS WHEN THEY ARE
NORMALLY SEARCHING, AND THEY
SLOW DOWN IN THE SEARCHER
EFFICIENCY TRIAL, THEN IT WILL BE
REFLECTED.

THAT IS ALL WE NEED IS THAT THE
TRIALS ARE DONE UNDER NORMAL
PROTOCOL.

WHAT THAT REALLY MEANS IS THE

SEARCHERS CAN'T KNOW WHEN THEY ARE BEING TESTED.

SO WE HAVE TO BE REALLY CAREFUL WE DON'T GIVE THAT AWAY.

WE CAN DO THAT BY MAKING SURE THAT WE VARY THE NUMBER OF CARCASSES THAT WERE PLACED IN ANY ONE DAY OR AND ANY TURBINE SO WE KEEP THEM ON THEIR TOES. TO CONTROL THE SEARCHER EFFICIENCY IT'S VERY DIFFICULT.

WE HAVE A FEW TOOLS.

WE CAN CLEAR VEGETATION.

THAT'S VERY EXPENSIVE.

WE CAN USE TRAINED DOGS TO INCREASE EFFICIENCY BUT NOT MUCH WE CAN DO ABOUT IT.

IT'S PRETTY MUCH A GIVEN.

FOR CARCASS PERSISTENCE, WE BASED THE CARCASS TRUST BASED ON THE RELEVANT FACTORS IN THE FACTOR COMBINATIONS.

HERE WE NEED TO GO AND CHECK THE CARCASSES TO SEE HOW LONG IT IS A PROCESS.

THAT'S WHAT WE'RE TRYING TO REMEASURE, PERSISTENCE TIME.

HERE'S AN EXAMPLE OF A CHECKLIST OR INTERVAL.

YOU WOULD CHECK OFTEN IN THE FIRST FEW DAYS, EARLY MONITORING IS CRITICAL.

AS THE CARCASS PROCESS LONGER AND LONGER, YOU DON'T NEED TO CHECK QUITE OFTEN.

YOU COULD CHECK ON THE EIGHTH DAY, THE TENTH DAY, YOU ARE SEPARATED BY TWO OR THREE DAYS AND THEN BY A WEEK.

EARLY ON, THAT'S WHERE IT'S CRITICAL.

WE WILL SEE THAT LATER.

WHAT WE ARE LOOKING FOR IS NOT WHETHER THE CARCASS IS THERE PARTICULARLY FOR BIRDS BUT

WHETHER THERE'S EVIDENCE OF THE CARCASS.

THAT MAY BEAT IN TERMS OF FEATHER SPOTS.

IF THERE'S A FEATHER SPOT EVEN THOUGH THE BODY OF THE BIRD IS NOT THERE THERE'S EVIDENCE THAT IT WAS THERE.

THAT WOULD BE CONSIDERED STILL PERSISTING.

THE TRICK WITH THIS WHOLE AFFAIR, THIS IS A TOUGH ONE, IS THAT THESE DATA ARE WHAT WE CALL CENSORED. THAT IS WE DON'T ACTUALLY OBSERVE THE POINT AT WHICH THE CARCASS IS REMOVED.

WE ONLY OBSERVE FOR THE MOST PART AND INTERVAL.

THAT IS FOR EXAMPLE, IF I WENT OUT THERE AND I'M CHECKING A CARCASS ON THE TENTH DAY IT'S STILL THERE BUT I GO BACK ON THE 14TH DAY AND IT'S GONE, WHAT I KNOW IS THE INTERVAL IN WHICH IT WAS REMOVED. THAT FEEDS INTO THE CARCASS PERSISTENCE MODEL ESTIMATION THAT WE HAVE.

SO WE MODEL PERSISTENCE TIME. USING WELL KNOWN SURVIVAL TECHNIQUES -- SURVIVAL ANALYSIS TECHNIQUES.

FROM THOSE MODELS THAN WE DON'T ACTUALLY USE THE PERSISTENCE TIME ITSELF, BUT WE USE THE MODEL WE DEVELOPED AND FROM AN ESTIMATE THE FRACTIONS OF CARCASSES THAT WE EXPECT TO PERSIST THROUGH OUR INTERVAL UNTIL THE NEXT SEARCH.

HERE IS AN EXAMPLE OF 4 DIFFERENT MODELS THAT COME FROM SURVIVAL ANALYSIS MODEL APPLICATIONS.

ALL FOUR OF THEM ACTUALLY HAVE THE SAME AVERAGE PERSISTENCE TIME.

BUT THEY HAVE A VERY DIFFERENT WAY OF ARRIVING AT THAT. THE GREEN ONE IS ONE IN WHICH THE CARCASSES PROCESSED QUITE WELL EARLY ON BUT THEN PERHAPS THESE ARE ALL FACTORY SCAVENGERS. THEY DON'T DETECT THEM RIGHT AWAY. ONCE THEY DETECT THAT THEY ARE REMOVED RELATIVELY RAPIDLY. THE RED ONE IS ONE IN WHICH THEY ARE REMOVED QUITE RAPIDLY INITIALLY WHEN THEY ARE FRESH. AND AFTER WHILE THEY'RE NOT SO TASTY ANYMORE AND THEY START TO PERSIST MUCH MORE READILY. EVEN THOUGH THEY HAVE AN AVERAGE PERSISTENCE TIME, THE PROBABILITY OF PERSISTING WANT TO DEVELOP THE MODELS WOULD THAT BE THE SAME FOR THESE. THE GREEN ONE WE HAVE A 76 PROBABILITY FOR THE INTERVAL AND THE RED ONE IS ONLY ABOUT 50 PERCENT, QUITE DIFFERENT. THIS IS WHERE THE MODEL ACTUALLY MAKES A HUGE DIFFERENCE. WE NEED USE USE SURVIVAL ANALYSIS TOOLS. THERE'S A PACKAGE PUT OUT BYE-BYE O3, AN ORGANIZATION OUT OF PORTUGAL. THERE'S ALSO AT USGS DATA SERIES 729 ON THE WEB THAT WILL CARRY A SURVIVAL ANALYSIS IN THE CONTEXT OF WIND TURBINES. SO HOW DO WE CONTROL FOR AVERAGE PERSISTENCE TIME? WE DON'T. IT'S REALLY DIFFICULT. IT'S A FUNCTION OF THE PRESSURE RIGHT NOW. WE COULD FENCE OUT OR TRAP OF SCAVENGERS. IT'S EXPENSIVE, BUT WE COULD DO IT.

BUT CONTROLLING THE PROBABILITY OF PERSISTENCE IS A MUCH EASIER THING TO DO.

WE DO THAT BY SIMPLY CONTROLLING THE LENGTH OF THE INTERVAL.

THE LONGER THE INTERVAL THE LESS LIKELY IT IS PERSISTING THREAT THE INTERVAL SO THAT'S AN EASY THING TO CHANGE.

TRANSECT WITH.

THE NEXT COMPONENT HAS TO DO WITH HOW WE DELINEATE THE SEARCH BOX.

IT'S PRETTY MUCH A FUNCTION OF THE BRUSHY NEST OF THE TERRAIN THE SIZE OF THE SEARCH PLOT WE WILL RECOMMEND THAT THE FULL WIDTH OF THE PLOT BE TWICE THAT TURBINE HEIGHT.

OF COURSE, IT WOULD BE LARGER FOR RAPTORS AND BIRDS.

BUT ONCE WE HAVE A DESIGNATED SEARCH PLOT, HOW DO WE ACCOUNT FOR UNSEARCHABLE AREAS?

EVEN MORE THAN THAT, DO WE ACTUALLY HAVE TO SEARCH THE WHOLE AREA?

HERE IS A SCHEMATIC OF THE LOCATIONS OF WHICH BAT CARCASSES WERE FOUND RELATIVE TO THE TURBINES AND THIS IS A COMPOSITE ACROSS SEVERAL SITES.

WHAT YOU SHOULD NOTICE IS THE DENSITY IS NOT CONSTANT.

THE OUTER RING IS 20 METERS, THERE ARE VERY FEW CARCASSES AND THE INNER 20-METER RING IT IS QUITE HIGH.

IF WE WERE TO TAKE THIS PLOT THAT IS 130 BY 130 METERS AND REDUCE IT BY 25 PERCENT, THAT 25 PERCENT WAS TAKEN AWAY FROM THE PERIMETER OF THE PLOT WE WOULD LOSE ALMOST NOTHING IN TERMS OF

THE CARCASSES THAT ARE LANDING THERE.

HOWEVER, IF WE TOOK IT OUT OF THE CENTER 25 PERCENT, WE WOULD LOSE ABOUT 85 PERCENT OF THE CARCASSES.

SO IT'S NOT JUST WHAT AREA WE ARE SEARCHING, BUT IT IS NOT THE FRACTION OF THE PLOT THAT IS SEARCHABLE BUT A QUESTION OF WHAT FRACTION OF THE CARCASSES WERE IN THE SEARCHABLE AREA, WERE POSSIBLY DETECTABLE.

HERE IS A 60-METER RADIUS POT, SAME KIND OF IDEA.

LET'S REDUCE THE AREA, THE RADIUS BY HALF.

SEARCH ONLY A 30-METER PLOT.

WE REDUCE THE AREA -- I'M SORRY THE RADIUS BY HALF, BUT IN SO DOING WE'VE

RESEARCHED -- REDUCE THE SEARCH AREA BY THREE QUARTERS AND WE'VE ONLY MISSED OR FORCED OURSELVES TO MISS ABOUT ONE QUARTER OF THE CARCASSES.

THIS IS SOMETHING WE PROBABLY NEED TO CONSIDER.

IN PRACTICE, THE AREAS THAT WE SEARCH ARE REALLY NOT REGULAR SO HOW DO WE GO ABOUT

ESTIMATING WHAT FRACTION OF CARCASSES ARE IN THOSE AREAS.

WE DEVELOP MODELS OF DENSITY AS A FUNCTION OF DISTANCE FROM THE TURBINE.

I CAN TAKE THOSE MODELS AND THEN TAKE THAT DENSITY AND PROJECT IT AS A THREE DIMENSIONAL OBJECT.

SO THIS THREE DIMENSIONAL CONE IS REPRESENTATIVE OF THE DENSITY AND HOW IT CHANGES WITH DISTANCE.

ITS VOLUME IS EQUAL TO ONE.

SO IF I CAN JUST CUT OUT THE

PORTION OF THAT CONE THAT I CANNOT SEARCH, I CAN ESTIMATE WHAT FRACTION OF THE CARCASSES REMAINED OBSERVABLE, NOT NECESSARILY OBSERVED BUT OBSERVABLE IN THAT SEARCH AREA. IN THIS CASE I TOOK AWAY 75 PERCENT OF THE PHYSICAL AREA OF THE PLOT BUT LEFT MYSELF WITH 60 PERCENT OF THE CARCASSES. SO IF FOR EXAMPLE, I HAD FOUND 50 CARCASSES IN AN AREA THIS SIZE, WITHOUT TAKING INTO ACCOUNT THE CHANGE IN DENSITY, I WOULD ESTIMATE THERE ARE 200 THAT WERE KILLED WHERE AS A MUCH CLOSER ESTIMATE WOULD BE 83 BECAUSE I KNOW THAT I'VE COMPRISED ABOUT 60 PERCENT, NOT JUST 25 PERCENT OF THE CARCASSES. SO WHEN WE MODEL DENSITY, THE DIFFICULT PART OF IT IS WE NEED A LOT OF LOCATION DATA. SO FOR THINGS LIKE EAGLES, LARGE RAPTORS WE DON'T HAVE A LARGE DATA SO IT MAY BE DIFFICULT, BUT WE CAN DEVELOP ALTERNATIVES. WE WILL ALSO NEED DATA AND FAR DISTANCES MAYBE UP TO 150 METERS SO THAT WHEN WE SEARCH -- IF WE DECIDE A 30-METER SEARCH RADIUS WILL BE APPROPRIATE WE STILL NEED TO SEARCH RATHER THAN THAT IN SOME AREAS, BUT IT COULD BE ACHIEVED BY SEARCHING THE ROADS AND EASY AREAS. THE HABITAT MAPS ARE WHAT DEFINED THE SEARCHED AREA AND WHAT WE USED TO EXTRACT WHAT PROPORTION OF CARCASSES WE BELIEVE ARE IN OUR SEARCH AREA. WE CAN CONTROL THIS FACTOR BY PRIMARILY BY FOCUSING ON THE SEARCH AREAS OF HIGHEST DENSITY.

THE NEXT FACTOR IS THE GENERAL SEARCH PROTOCOL.

THEY LIST SEVERAL THINGS.

THEY ALL FEED INTO ESTIMATIONS WHETHER IT IS TO THE PROPORTION OF SEARCHED AREA OR THE PERSISTENCE OR THE SEARCHER EFFICIENCY.

THE ONE PIECE I WANT TO POINT OUT THEY DID NOT NECESSARILY MENTION WAS THAT NOT ONLY DO WE NEED THE DATE THAT THE CARCASS WAS FOUND, BUT WE ALSO NEED THE DATE OF THE MOST RECENT SEARCH THAT WAS CONDUCTED AT THAT PARTICULAR TURBINE.

THAT IS WHAT ALLOWS US TO ESTIMATE THE PERSISTENCE PROBABILITY.

NOW WE PUT THIS ALL TOGETHER INTO AN ESTIMATOR.

THIS IS SORT OF THE GENERAL FORM OF MOST ESTIMATORS.

WE HAVE K . EQUALS ALL THE DIFFERENT FACTOR COMBINATIONS, C . IS THE NUMBER OF CARCASSES WE FIND IN ANY FACTOR COMBINATION, F . IS THE FRACTION OF TURBINES WE SAMPLE.

S . IS THE PROPORTION OF CARCASSES IN THE SEARCHED AREA BENEATH THOSE TURBINES.

AND P . AND R . ARE THE SEARCHER EFFICIENCY AND THE PROBABILITY OF PERSISTING THROUGH INTERVAL.

ALL OF THOSE FACTORS ARE BETWEEN ZERO AND ONE AND ALL OF THEM COMBINE MULTIPLICATIVE LEAD TO FORM WHAT WE CALL THE GENERAL OR THE OVERALL PROBABILITY OF DETECTION WHICH I'VE NOTED AS G .

LET'S GO THROUGH AN EXAMPLE.

IN THIS PARTICULAR CASE WE HAVE EIGHT OUT OF 19 TURBINES THAT

WAS A SIGHT OF THE SEARCH.
WE HAVE WITHIN THE SEARCH AREA,
WE ESTIMATE THERE'S 85 PERCENT
OF THE CARCASSES WILL FALL.
THE PROBABILITY OF PERSISTING A
75 PERCENT AND THE PROBABILITY
THE SEARCHER WILL FIND
SOMETHING ON THE GROUND IS
60 PERCENT.
THIS IS FOR SOME PARTICULAR
FACTOR COMBINATION AT A SITE.
OVERALL PROBABILITY OF DETECTION
FOR THAT COMBINATION FACTOR IS
.16.

FROM THAT, IF FOR EXAMPLE, WE
FOUND 30 CARCASSES AND WE
DIVIDE BY .16, WE WOULD GET AN
ESTIMATE OF 187.5.
I WILL TELL YOU RIGHT NOW, THAT IS
WRONG.

ALMOST ALL ESTIMATES ARE WRONG
AND IT'S NOT JUST WRONG BECAUSE
IT'S A FRACTION AND CARCASSES
DON'T COME INFRACTIONS BUT IT'S A
WRONG BECAUSE THERE IS NO
UNCERTAINTY ASSOCIATED WITH IT.
WE DO NOT KNOW THAT THERE ARE
187.5 OUT THERE.

WE ONLY KNOW THERE ARE ABOUT
THAT MANY.

SO WE NEED TO INCORPORATE
UNCERTAINTY AND WE DO THAT BY
REALIZING THAT THE ESTIMATE FOR
OUR FRACTION OF CARCASSES IN
THE SEARCHED AREA IS JUST THAT
AN ESTIMATE.

IT RANGES IN THIS CASE
72-98 PERCENT.

SAME WITH PERSISTENCE AND
SEARCHER EFFICIENCY.

I WILL NOTE THAT THE FRACTION OF
TURBINES, NO ERROR ON THAT ONE.
NO VARIANTS.

WE KNOW HOW MANY TURBINES WE
SEARCHED.

WE TAKE ALL OF THOSE AND LOOK AT THE VARIANTS ASSOCIATED WITH THAT AND NOW ARE PROBABILITY OF DETECTION IS NOT JUST .16, BUT IT RANGES SOMEWHERE BETWEEN .07 AND .025.

THE CONSEQUENCES OF THAT IS OUR ESTIMATE OF FATALITY ITSELF WILL HAVE A RANGE OF 120-360.

THAT IS A 230 CARCASS DIFFERENCE BETWEEN THE LOWEST AND THE HIGHEST.

SO WHAT DO WE DO?

IN THIS EXAMPLE I HAVE INCREASED ALL OF THOSE FACTORS OVER WHICH WE HAVE SOME CONTROL AND BROUGHT THEM TO A HIGH LEVEL SO THAT OUR OVERALL PROBABILITY OF DETECTION IS ABOUT .07.

AT THE SAME SITE WITH THE DETECTION OF .7 WE WILL SEE MORE CARCASSES SO LET'S SAY WE SEE 131, WE ARE STILL ESTIMATING ABOUT 185 CARCASSES, JUST LIKE WE DID BEFORE.

BUT, THE VARIANTS ON THESE COMPONENTS IS QUITE A BIT SMALLER AND OUR PROBABILITY OF DETECTION RANGES FROM .63-.77.

THE RESULTS BEING THAT THE ULTIMATE ESTIMATE OF FATALITY NOW RANGES FROM 170-206.

THAT'S ABOUT A 35 CARCASSES RANGE IN DIFFERENCE BETWEEN THE LOWEST AND THE HIGHEST.

MUCH, MUCH MORE PRECISE.

THE POINT IS, INCREASE YOUR PROBABILITY OF DETECTION AND YOU WILL DECREASE THE UNCERTAINTY IN YOUR ESTIMATE.

SO THERE ARE SEVERAL ESTIMATORS OF FATALITY AVAILABLE.

I HAVE DEVELOPED ONE, SCHONFELD IS OFTEN LEAD USED BUT NOT BEEN PUBLISHED IN A PEER REVIEW

LITERATURE.
IT'S CERTAINLY USED BY A LOT OF
PEOPLE.
CORNER HAS PUBLISHED AN
ESTIMATOR.
WOLPERT IS DEVELOPING ONE, AS
FAR AS I KNOW IT'S NOT YET
PUBLICLY AVAILABLE.
ALL OF THESE ARE ASSUMPTIONS.
IF THE ASSUMPTIONS OF THESE ARE
MET, I THINK THAT ALL OF THEM WILL
PRETTY MUCH ESTIMATE THE SAME
THING.
BUT IT'S CRITICAL THAT THE
ASSUMPTIONS BE MET.
THE FIRST THREE HAVE BEEN
INCORPORATED INTO THE USGS DATA
SERIES 729 AND THE LAST ONE
PERHAPS WILL BE ONCE IT'S
PUBLICLY AVAILABLE.
ALL OF THESE COMMENT NO MATTER
WHICH ONE NEED A VARIANT
ESTIMATE AND THAT'S DIFFICULT.
IT'S VERY DIFFICULT -- VERY HARD TO
DEVELOP A VARIANT ON THIS
FUNCTION THAT WE HAVE SO RECENT
VARIATIONS, THE ONE I USE IS A
BOOT STRAP IT TO WELL KNOWN
DEVICE AND WOLPERT I BELIEVE
USES A CLOSED FORM SOLUTION AND
OTHER PEOPLE HAVE USED WHAT IS
CALLED A SOLUTION YOU CAN WRITE
AN EQUATION TO THE VARIANTS
WERE A BOOTSTRAP THERE'S NO
EQUATION WRITTEN IT'S A PROCESS
THAT ALLOWS YOU TO ESTIMATE
THAT WITHOUT WRITING ANY
QUESTION AND MAKING
ASSUMPTIONS.
THOSE ALTERNATIVES, NOT THE
WOLPERT ONE BUT THE ALTERNATIVE
SOLUTIONS HAVE RESULTED IN
NEGATIVE LIMITS THAT HAVE BEEN
REPORTED IN THE LITERATURE.
SO THIS BRINGS ME TO A REALLY

IMPORTANT POINT.
IF YOU ARE GIVEN A REPORT, AND
THERE IS NO ESTIMATE -- SORRY
THERE IS NO MEASURE OF
UNCERTAINTY AS TO SAY WITH YOUR
ESTIMATE, PLEASE SEND IT BACK.
IN FACT,, USE YOUR COMMON SENSE.
IF THERE'S AN ESTIMATE OF
UNCERTAINTY BUT IT'S AS SMALL AS
NEGATIVE 150, SEND IT BACK.
I KNOW THE STATISTICS ARE
DIFFICULT BUT USUALLY WE ARE NOT
UNREASONABLE.
WE NEED TO USE COMMON SENSE.
A QUESTION ARISES, THE SECOND
QUESTION THAT WE ARE
ADDRESSING IS WHAT ARE THE
FATALITY RATES OF SPECIES OF
CONCERN?
WE OF CURRENT PROPOSALS TO
LIMIT -- TO PERMIT LIMITED NUMBER
OF COLLISION CAUSED DEATHS OF
CERTAIN SPECIES.
THE LIMITS OF OUR DIRECT FROM
POPULATION MODELS AND COLLISION
RISK MODELS, BUT ONE QUESTION IS
HOW DO WE KNOW WHEN THEY ARE
EXCEEDED?
SOMETIMES THE ANSWER GIVEN IS
WE CAN ESTIMATE FATALITY USING
OUR CURRENT POST-CONSTRUCTION
PROTOCOLS.
I WANT TO POINT OUT THOSE
PROTOCOLS ARE NOT DESIGNED TO
DETECT WHEN CARCASSES -- TO BE
ABLE TO ESTIMATE WELL WHEN THE
CARCASS POPULATION IS VERY LOW.
THEY ARE DESIGNED FOR WHEN THE
CARCASS POPULATION IS RELATIVELY
HIGH.
THEY ARE DEFINITELY INADEQUATE
FOR A SMALL POPULATION WHICH IS
WHAT WE EXPECT WHEN WE ARE
DEALING WITH T. AND E. SPECIES.
THERE IN ADEQUATE TO DETECT

WHEN A LIMIT HAS BEEN EXCEEDED.
SO THE CURRENT ESTIMATORS WE
HAVE CANNOT ESTIMATE ANYTHING
BUT ZERO WHEN WE OBSERVE ZERO.
THERE IS PULMONARY WORK GOING
ON RIGHT NOW ON USING BAYESIAN
ESTIMATORS TO BE ABLE TO DETECT
WHETHER IT LIMITS MIGHT BE
EXCEEDED.
THAT'S ABOUT ALL I WILL SAY ABOUT
THAT BECAUSE THIS IS A TOPIC THAT
WILL PROBABLY TAKE UP ON
ANOTHER SESSION.
LET'S RETURN TO THE TIER 4
QUESTIONS.
I'VE KIND OF GROUPED THEM INTO
SETS.
THESE THREE BASICALLY HAVE TO DO
IS SIMPLY ESTIMATION.
WHAT IS THE FATALITY OF BIRDS AND
BATS?
WHAT IS THE FATALITY OF SPECIES
OF CONCERN?
WHAT'S THE FATALITY OF
PARTICULAR SUBSETS OF BIRDS AND
BATS?
WITH RESPECT TO THE FIRST ONE,
WHAT OUR BIRD AND THAT FATALITY
RATES?
QUESTIONS HAVE COME UP ABOUT
HOW DO WE PRESENT THOSE DATA
SHOULD WE PRESENT THEM PER
TURBINE, PER MEGAWATT
NAMEPLATE, PER ACTUAL MEGAWATT
HOUR PRODUCTION OR MAYBE EVEN
PER 10,000 METERS SQUARED OF
ROAD SWEEPED AREA.
ALL OF THESE ARE REASONABLE AND
MIGHT ACTUALLY SERVE TO BETTER
BE ABLE TO COMPARE ACROSS SITES
WITH DIFFERENT TURBINES SIZES
AND CONFIGURATIONS.
DIFFERENT TURBINES SIZES.
WHAT I WOULD LIKE YOU TO KEEP IN
MIND IS ALL ARE DERIVED FROM A

BASIC MEASURE WHICH IS THE PER
TURBINE FATALITY RATE.

I THINK THESE ARE VERY, VERY
USEFUL, BUT IT DOES NOT MEAN WE
WILL GET RID OF OUR SAMPLING
PROCESS.

THAT IS STILL A TURBINE BY TURBINE
PROCESS BUT REPORTING IT I THINK
IS A GREAT IDEA TO TRY AND CHANGE
TO ALTERNATIVE MEASURES.

IN ESTIMATING -- I GUESS THAT'S IT.

SO THE NEXT SET OF TIER 4
QUESTIONS HAVE TO DO WITH
COMPARISONS.

TO THE ESTIMATED FATALITY RATES
COMPARE WITH WHAT WE
PREDICTED, DO THEY COMPARE WITH
NEIGHBORING SITES AND HOW
TODAY -- ARE THEY LARGE ENOUGH
THAT THEY WOULD CAUSE US TO
HAVE CONCERNS AND LEAD TO
OTHER MEASURES TO REDUCE
IMPACT?

THESE ARE ALSO GOOD COMPARISON
QUESTIONS.

WHEN WE ARE ADDRESSING THOSE
IT'S REALLY CRITICAL THAT WE KEEP
IN MIND UNCERTAINTY.

UNCERTAINTY MATTERS.

WE REALLY HAVE TO UNDERSTAND
THAT BOTH THE LOWER AND THE
UPPER CONFIDENCE LIMITS PLAY IN.

WE DON'T REALLY KNOW WHERE THE
TRUTH LIES WITHIN THAT
CONFIDENCE LIMIT.

ALL WE KNOW IS FOR THE MOST PART
IT WILL BE SOMEWHERE IN THERE.

SO IF WE NEED NARROW NEST WE
NEED A PRECISE ANSWER AND WE
NEED TO DESIGN TO ACHIEVE THAT
PRECISION.

THE FINAL QUESTION IS A
RELATIONSHIP QUESTION.

DOO BIRD AND BETH FATALITIES VARY
WITH RELATIONS TO SITE

CHARACTERISTICS?
IT'S AN IMPORTANT QUESTION AND A
DIFFICULT QUESTION TO ANSWER
WITHOUT A LOT OF OBSERVED
FATALITIES AND VARIATION ACROSS
THE SITES.
IT'S SOMETHING WHERE IF THAT'S
WHAT YOU WANT TO ANSWER, THE
MORE TURBINES YOU SEARCH, THE
BETTER.
SO WITH THAT, I'D LIKE TO CONCLUDE
BY SAYING CAN WE ANSWER THE TIER
4 QUESTIONS.
THE ANSWER IS YES.
WE DEFINITELY CAN.
WHEN WE ARE DOING SO THOUGH,
WE HAVE TO BE SURE WE KEEP IN
MIND ALL THE TIME THE VARIANCES
ASSOCIATE WITH THE ESTIMATES WE
ARE USING TO MAKE OUR INFERENCE,
TO UNDERSTAND OUR SYSTEM.
WITH THAT I WOULD LIKE TO CLOSE
AND THANK CHRISTY FOR INVITING
ME, THE U.S. FISH AND WILDLIFE
SERVICE AND THE USGS FOR THEIR
FINANCIAL SUPPORT FOR THIS
RESEARCH OR THE WORK THAT I DO
AND DEFINITELY MY COLLEAGUES
DAVID DALE AND DAN GO FORTH FOR
THEIR CONTRIBUTIONS.
FINALLY, I WANT YOU TO REMEMBER I
WILL TAKE VERY LIBERALLY FROM
ERICH SEGAL STATISTICS MEANS
NEVER HAVING TO SAY YOU'RE
CERTAIN.
AND ACTUALLY IT SAYS NEVER BEING
ABLE TO SAY YOU ARE CERTAIN.
THANK YOU VERY MUCH.
WITH THAT I THINK I WILL MOVE OVER
WITH CHRISTY AND TAKE YOUR
QUESTIONS.
>>CHRISTY JOHNSON-HUGHES:
THANK YOU SO MUCH FOR THAT
GREAT PRESENTATION AND WE
WOULD LIKE TO INVITE OUR

AUDIENCE TO TYPE IN ANY QUESTIONS YOU HAVE INTO THE CHAT BOX OR YOU CAN USE THE E-MAIL ADDRESS IF YOU HAVE A LONGER QUESTION.

ALSO MANUELA DID A LONGER VERSION OF HER PRESENTATION THAT WE WILL PUT UP ON THE WEBSITE SO THAT IF YOU WOULD LIKE TO HAVE FURTHER INFORMATION WITH MORE OF THE REFERENCES, YOU MAY ASK SAYS MANUELA'S LONGER PRESENTATION ONCE THAT LINK IS UP YOU BE ABLE TO GET TO THAT.

WHAT WE WOULD LIKE TO DO NOW IS TALK A LITTLE BIT MORE TO MANUELA ABOUT HER RESEARCH AND SOME QUESTIONS THAT WE HAVE BEEN RECEIVING FROM OUR AUDIENCE.

MANUELA, LET'S GO AHEAD AND GET TO SOME OF THESE QUESTIONS. SO HOW DOES TIER 4 WORK FOR FACILITIES OPERATIONAL WHEN THE GUIDELINES ARE FINAL BUT WHERE THE FACILITY HAS LIMITED BASELINE SURVEY RESULTS?

THAT SOUNDS TO ME LIKE THE FACILITY MAY NOT HAVE COLLECTED TIER 3, POST- CONSTRUCTION DATA AND THEY MAY NOT HAVE COLLECTED IMMEDIATE TIER 4 POST CONSTRUCTION DATA OPERATIONAL, A YEAR AND A HALF OR TWO YEARS AGO.

SO THEY MAY HAVE VERY LIMITED DATA IF I UNDERSTAND THIS KARESH -- QUESTION CORRECTLY. IF THAT'S THE CASE, WE DO ENCOURAGE ANY FACILITY TO BEGIN LOSING THE GUIDELINES WERE EVER -- BEGAN USING THE GUIDELINES WHEREVER APPROPRIATE.

IF THEY WERE OPERATIONAL WHEN

THE GUIDELINES WERE FINALIZED
THEY MAY STILL BE WORTH THEIR
WHILE TO ENGAGE IN
POST-CONSTRUCTION STUDIES
REALIZING IT MAY BE DIFFICULT TO
COMPARE THAT WITH
PRECONSTRUCTION, YOU DON'T HAVE
PRECONSTRUCTION DATA.

BUT IT MAY PROVIDE SOME DATA
THAT WE CAN COMPARE TO OTHER
WIND FACILITIES IN A SIMILAR AREA.
SO EVEN THOUGH IT YOU MAY NOT
HAVE A STRONG DATA SET TO USE,
THERE MAY BE STILL SOME UTILITY
COLLECTING THAT DATA.
THE FACILITY MAY ALSO WANT TO GO
INTO TIER FIVE AND TRADITIONAL
RESEARCH STUDIES.

IT'S SOMETHING TO TALK ABOUT WITH
YOUR LOCAL SERVICE FIELD OFFICE
AND YOUR STATE REPRESENTATIVES.
LET'S MOVE ON TO ANOTHER
QUESTION.

HOW DOES THE MODEL CHANGE IF
THE SEARCHES DONE WEEKLY?
DOES IT TAKE INTO ACCOUNT
TOPOGRAPHY OR ANY OTHER
FACTORS THAT MIGHT MAKE SOME
PARTS OF THE FACILITY MORE LIKELY
TO HAVE FLIGHTS?

LONG AND INVOLVED QUESTION
THERE.

WHAT DO YOU THINK MANUELA?

>>MANUELA HUSO: I THINK THAT'S
AN INTERESTING QUESTION.

THE QUESTION ABOUT THE FLIGHTS
IS SOMETHING I HOPE IS TAKEN INTO
ACCOUNT WHEN YOU ARE
DETERMINING WHICH TURBINES TO
SAMPLE.

AS STATISTICIANS, WE ALWAYS THEY
TAKE A RANDOM SAMPLE AND BY
TAKING A RANDOM SAMPLE YOU WILL
MORE OR LESS A SURE YOU HAVE
REPRESENTATION OF THE VARIATION

IN FLIGHTS AND CONSEQUENTLY
THEIR RISK THAT MIGHT BE A SISSY
WITH EACH OF THOSE TURBINE SO A
RANDOM SAMPLE OF TURBINES IF
YOU'RE NOT SEARCHING THEM ALL IS
DEFINITELY IN ORDER.

THE QUESTION OF WEEKLY, THAT IS
THE SORT OF INFORMATION YOU
PROVIDE TO THE ESTIMATORS.

SO THE ESTIMATORS ARE NOT
LIMITED BY YOUR SEARCHES.

YOU CAN HAVE SEARCHES ON A
DAILY BASIS, WEEKLY, OR MONTHLY
BASIS IF APPROPRIATE.

YOU CAN EVEN HAVE IT ON AN
IRREGULAR BASIS FOR SOME OF THE
ESTIMATIONS.

WHAT WE WANT TO TRY TO ASK YOU
TO THINK ABOUT WHEN YOU ARE
DESIGNING HOWEVER, IS THE
INTERVAL YOU CHOOSE TO SEARCH
AT IS SOMEWHAT BASED ON WHAT
YOU PERCEIVE TO BE THE RISK OF
SCAVENGING.

SO YOU DON'T HAVE AN INTERVAL
THAT IS SO WIDE THAT MOST OF
YOUR CARCASSES WILL BE GONE BY
THE TIME YOU GO LOOK FOR THEM
OR SO NARROW THAT YOU ARE
ALMOST WASTING MONEY AND
EFFORT BECAUSE HARDLY ANY OF
THEM HAVE BEEN TAKEN AWAY.
SO IT'S A TRADE-OFF AND A BALANCE
THAT THE ESTIMATOR CAN ADJUST
FOR DIFFERENT SEARCH AREAS.

>>CHRISTY JOHNSON-HUGHES:
THANK YOU.

LET'S GET TO ANOTHER QUESTION.
DOO METHODS CHANGE WHEN
TALKING ABOUT LARGER BIRDS FOR
EXAMPLE, WITH A 75 METERS CIRCLE
AROUND US IRVINE IN
APPROXIMATELY 20 DAY INTERVAL BE
ACCEPTABLE?

THIS WOULD BE ON THE SCALE OF

RAPTORS.

>>MANUELA HUSO: THE ANSWER IS
YES, AND NO.

IN APPROPRIATE

CONVICTIONS -- CONDITIONS

PERHAPS THAT'S ACCEPTABLE.

BUT IT ALL DEPENDS WHAT YOUR
INDIVIDUAL SITE PREDICTIONS ARE.

IF THERE'S RAPTOR

PRESSURE -- SORRY SCAVENGER

PRESSURE IS HIGH THAN A 20 DAY

INTERVAL IS NOT NARROW ENOUGH.

SO THAT IS REALLY SOMETHING THAT
IS DETERMINED ON A STATE BY STATE
LEVEL.

>>CHRISTY JOHNSON-HUGHES:

THANK YOU.

SO WE HAVE ONE QUESTION HERE

ABOUT SPECIES OF HABITAT

MENTATION CONCERNS.

LET'S GET TO THAT WITH OUR NEXT

SET OF GUESS AND FOCUS ON THIS

QUESTION ABOUT IS THERE A

PARTICULAR MATHEMATICAL MODEL

U.S. FISH AND WILDLIFE SERVICE

RECOMMENDS?

I FEEL LIKE SAYING YES, AND NO TO

THAT AS WELL.

AND THE REASON FOR THAT IS WE

WORK VERY CLOSELY WITH THE

USGS AND WITH MANUELA TO PUT

TOGETHER THESE STATISTICAL

MODELS BECAUSE WE SEE A NEED

FOR THESE AND USGS HAS HELPED

DEVELOP THESE MODELS.

THESE ARE CERTAINLY MODELS THAT

WE PREFER TO USE.

WE HAVE A VESTED INTEREST IN

THEM AND WE FEEL ANSWER THE

QUESTIONS THAT WE ARE POSING.

WE DO KNOW THAT THERE ARE

OTHER RESOURCES OUT THERE THAT

PEOPLE CAN USE AND MANUELA,

YOU'VE TALKED A LITTLE BIT ABOUT

SOME OF THOSE RESOURCES.

DID YOU WANT TO BRING UP
ANYTHING FURTHER?

>>MANUELA HUSO: AS I SAID IN MY
TALK, THE ESTIMATORS THAT WE
HAVE CURRENTLY AVAILABLE HAVE
DIFFERENT ASSUMPTIONS.
IF YOU HAVE A SITE IN WHICH ONE OF
THOSE ESTIMATOR ASSUMPTIONS IS
MORE LIKELY TO BE MET THAN
ANOTHER THEN PROBABLY YOU
WANT TO USE THAT.

THE GUIDELINES THEMSELVES DO
MENTIONED THERE ARE SOME
ESTIMATORS IN THE LITERATURE
THAT ACTUALLY SHOULD NOT BE
USED.

THEY ARE THERE BUT MOST PEOPLE,
EVERYBODY BASICALLY AGREES
THEY HAVE FAULTS ASSOCIATE WITH
THEM SO THEY SHOULD NOT BE
USED.

SEVERAL OF THEM ARE OUT THERE,
THE ONES I MENTIONED ALL SHOULD
GIVE YOU ABOUT THE SAME ANSWER
AS LONG AS THE ASSUMPTIONS ARE
MET.

>>CHRISTY JOHNSON-HUGHES:
THANK YOU.

WITH PRECONSTRUCTION AND
DURING CONSTRUCTION, FATALITY
MONITORING IMPACTS THE MODELING
OF DATA.

IN THIS CASE THERE ARE NO
EXISTING TURBINES.

I AM TRYING TO UNDERSTAND THE
QUESTION.

SO WE HAVE PRECONSTRUCTION
DURING CONSTRUCTION FATALITY
MONITORING IMPACT THE MODELING
OF POST CONSTRUCTION DATA.

>>MANUELA HUSO: IF I
UNDERSTAND CORRECTLY I THINK
THE ANSWER IS NO.

WHAT WE DO WITH POST
CONSTRUCTION IS WE TRY TO

ESTIMATE THE FATALITY THAT'S BEEN CAUSED BY THE TURBINES.

WE COMPARE THAT WITH THE INFORMATION THAT WE GATHERED FROM PRECONSTRUCTION WITH WHICH WE ESTIMATED PREDICTED FATALITIES AND WE LOOK TO SEE IF WE WERE EVEN CLOSE. IN TERMS OF USING THAT INFORMATION AT THIS POINT, NO THE DATA THAT WE USE FOR ESTIMATIONS COMES SOLELY POST CONSTRUCTION.

>>CHRISTY JOHNSON-HUGHES: THANK YOU.

WE HAVE A RATHER LONG QUESTION HERE SO LET'S GET TO THIS. YOU PRESENTED A CARCASS DENSITY PLOTS FOR HELPING TO DETERMINE SEARCH AREAS. IS THERE A PARTICULAR SOFTWARE YOU MIGHT RECOMMEND BE USED TO CREATE SITE SPECIFIC SEARCH PLOTS?

>>MANUELA HUSO: UNFORTUNATELY AT THIS POINT THERE IS NONE OTHER THAN SORT OF THE TYPICAL SOFTWARE THAT IS USED IN STATISTICS. BUT YOU HAVE TO BE KNOWLEDGEABLE ABOUT HOW TO DEVELOP THOSE MODELS. SO UNFORTUNATELY, NO THERE'S NO READILY AVAILABLE SOFTWARE YET. WE ARE WORKING ON SOME SOFTWARE.

>>CHRISTY JOHNSON-HUGHES: WE ARE NOT THERE YET. ALL RIGHT ANOTHER QUESTION, HOW DID A MODEL ACCOUNT FOR CARCASSES FROM OTHER SOURCES OF FATALITY? SO THIS WOULD BE OTHER FATALITIES OTHER THAN PRESUMED TURBINE STRIKES?

SO IT COULD BE ANYTHING ELSE,
LIGHTNING OR SOMETHING ELSE.

>>MANUELA HUSO: AT THIS POINT,
THE JOB OF ACCOUNTING FOR THOSE
OTHER SOURCES OF FATALITIES IS
NOT PLACED ON THE SOFTWARE.
THE JOB OF ACCOUNTING FOR THOSE
ARE BASED ON THE BIOLOGIST AND
THE PEOPLE IN THE FIELD OBSERVING
THE CARCASSES.

THERE ARE SOME CARCASSES THAT
MIGHT BE ABLE TO INFER PROBABLY
WAS NOT KILLED BY A TURBINE.
IT MIGHT BE LIKE WITH BIRDS, BUT
OTHERS, THERE MAY BE SOME
REASON THE BIOLOGIST BELIEVES
THEY WERE NOT KILLED BY TURBINES
AND IF THAT WAS A CASE THEY
WOULD NOT BE ENTERED INTO THE
DATASET USED TO ESTIMATE THE
FATALITY.

ONCE THE DEBT IS ENTERED IN THE
DATASET THE ASSUMPTION IS THERE
IS REASON TO BELIEVE IT WAS
CAUSED BY THE TURBINES.

>>CHRISTY JOHNSON-HUGHES:
THAT MAKE SENSE.

ALL RIGHT ANOTHER QUESTION, HOW
DO YOU ACCOUNT THE DENSITY
WEIGHTED PROPORTION VALUE THAT
IS INPUT INTO THE FATALITY
ESTIMATOR SOFTWARE?

>>MANUELA HUSO: THERE ARE
SEVERAL WAYS TO DO THAT AND
THAT'S WHAT THAT WAS ANSWERING
IS THERE SOFTWARE AVAILABLE TO
DO THAT YET AND THERE IS NO
SOFTWARE DEDICATED TO DOING
THAT EXACTLY.

WHAT WE HAVE USED IS MODELS AND
THEY WORK QUITE WELL.

THERE OTHER APPROACHES THAT
COULD BE USED, BUT IT IS MORE OR
LESS A REGRESSION TYPE OF MODEL,
UNDERSTANDING THE RESPONSE

VARIABLE IS NOT [INAUDIBLE].

>>CHRISTY JOHNSON-HUGHES:
OKAY.

LET'S GO TO ANOTHER QUESTION
WHAT TYPE OF DATA SHOULD THE
APPLICANT COLLECT
PRE- OPERATION THAT WOULD HELP
FORM A BASELINE TO COMPARE TO I
WOULD ASSUME POST OPERATION?
WHAT AMOUNTS OF MORTALITY IS
DUE TO OPERATIONS VERSUS
BASELINE MORTALITY?

>>MANUELA HUSO: THIS IS A
QUESTION THAT COMES UP FAIRLY
OFTEN.

I THINK THE WAY YOU COULD DO
WITH IS TO DESIGNATE AREAS THAT
YOU BELIEVE TO BE REPRESENTATIVE
OF WHERE YOU MIGHT ESTABLISH
TURBINES FOR THE FUTURE.
SOME OF THOSE ARE SET UP
ALREADY.

THEY DON'T HAVE TO BE EXACT, BUT
IT WOULD REQUIRE THAT YOU GO
OUT AND PERFORM SEARCHES AS IF
THERE WERE TURBINES THERE AND
THAT'S THE ONLY DIFFERENCE.
THERE WOULD BE NO DIFFERENCE
OTHER THAN THAT.

AND THEN CALCULATE FATALITIES.
SO THAT IS VERY EXPENSIVE THEN
ASKING SOMEBODY TO DO THAT IS UP
TO WHETHER THEY'VE GOT THE
MONEY OR NOT.

OTHERWISE, I'M NOT SURE HOW YOU
WOULD GO ABOUT DISTINGUISHING
THE BACKGROUND FATALITY FROM
CURRENT FATALITY.

ONE POSSIBLE METHOD WHICH IS
PERHAPS A LITTLE DIFFERENT IS TO
DESIGNATE AREAS THAT ARE FAR
ENOUGH AWAY FROM THE TURBINES
THEY WOULD NOT BE LIKELY TO
CONTAIN TURBINE KILLED AREAS
THAT ARE SOMEHOW IN SIMILAR

HABITATS AND SIMILAR TYPES OF CONDITIONS THEY WOULD BE REFLECTIVE OF BASIC BACKGROUND. CONDUCT THOSE STUDIES IN CONJUNCTION WITH YOUR POST CONSTRUCTION SURVEYS. AGAIN IT WOULD BE A LITTLE MORE EXTENSIVE AND YOU WOULD JUST HAVE SOME EXTRA PSEUDO TURBINES OUT THERE TO SEARCH. AND THAT MIGHT GIVE YOU A NICE BASELINE IDEA.

>>CHRISTY JOHNSON-HUGHES:
EXACTLY.

THAT MIGHT ALSO BE AN IDEA FOR TIER FIVE RESEARCH PROJECTS IF IT WAS NOT DONE AT AN INDIVIDUAL FACILITY.

MOVING ON, DO MONITORING METHODS FOR BATS VARY SIGNIFICANTLY FROM BIRDS?

>>MANUELA HUSO: I WOULD SAY IN GENERAL, NO.

PROBABLY THE PRIMARY DIFFERENCE IF YOU TAKE THE GROUP OF BIRDS TOGETHER IS BATS ARE GENERALLY SMALLER THAN JUST ABOUT EVERY BIRD OUT THERE.

CERTAINLY NOT ALL OF THEM BUT A LOT OF THEM.

SO THE DIFFERENCE REALLY LIES IN THAT WE PROBABLY DO HAVE TO SEARCH A LITTLE BIT MORE SLOWLY. A LITTLE HARDER IN ABLE TO FIND THE BATS THAT ARE OUT THERE BECAUSE THEY ARE SO SMALL BUT THE GENERAL PROCESS IS VERY MUCH THE SAME.

IT DOES NOT MATTER WHAT SPECIES YOU ARE APPLYING THEM TO.

>>CHRISTY JOHNSON-HUGHES:
DOES PRECONSTRUCTION DESIGN AFFECT POST CONSTRUCTION STUDY DESIGN?

>>MANUELA HUSO: I DON'T QUITE

UNDERSTAND THAT ONE.
PRETE CONSTRUCTION DESIGN OF
WHAT?

>>CHRISTY JOHNSON-HUGHES: I AM
NOT SURE, BUT I WOULD TAKE AN
INITIAL STAB AT THIS DOES
PRECONSTRUCTION STUDY DESIGN
AFFECT POST CONSTRUCTION STUDY
DESIGN?

IF THAT HAS TO DO WITH RELATING
TO THE ANTICIPATED TAKE -- WHAT
WE ANTICIPATED WOULD OCCUR BUT
THE THING IS THAT
PRECONSTRUCTION STUDIES OFTEN
DO NOT INVOLVE FATALITIES
STUDIES.

THEY ARE THERE REALLY TO TRY AND
FIGURE OUT WHAT SPECIES MIGHT BE
THERE IF THERE ARE ANY SPECIES
WE NEED TO PAY PARTICULAR
ATTENTION TO ESPECIALLY FOR
SPECIES OF CONCERN OR OTHER
ISSUES WE MIGHT NOT BE AWARE OF
ON THE INITIAL SEARCH SO THOSE
PRECONSTRUCTION STUDIES CAN
SOMETIMES PLAY A LITTLE
DIFFERENT ROLE WE DO A RISK
ESTIMATE AND THE RISK ESTIMATES
SOMETIMES CAN GIVE US SOME KIND
OF POTENTIAL ESTIMATE OF
FATALITIES ESPECIALLY IF YOU ARE
DEALING WITH A FEDERALLY LISTED
SPECIES THAT NEEDS TO HAVE A
TAKE NUMBER.

BUT I WOULD IMAGINE THAT THE
POST CONSTRUCTION STUDIES
WOULD BE DIFFERENT BECAUSE YOU
ACTUALLY HAVE PURCHASES AT THAT
POINT IN TIME VERSUS JUST TRYING
TO BASES INFORMATION OFF OTHER
FACILITIES OR INFORMATION IN THE
LITERATURE.

>>MANUELA HUSO: LIKE I SAID IN MY
TALK, THE WAY WE WOULD DESIGN
FOR BEING ABLE TO DETERMINE

WHETHER I TAKE HAS BEEN
EXCEEDED IS VERY DIFFERENT FROM
WHAT I TALKED ABOUT TODAY.
SO IF THAT IS WHAT HAS BEEN
SIGNALLED IN THE
PRECONSTRUCTION, THAT YOU HAVE
A SPECIES OF CONCERN YOU WERE
NOT AWARE OF BEFORE, THEN
DEFINITELY THAT WOULD AFFECT THE
DESIGN.

>>CHRISTY JOHNSON-HUGHES:
THAT'S GOOD TO KNOW.
THANK YOU.

ALL RIGHT A LARGE PROPORTION OF
FATALITIES IN THE GREAT LAKES ARE
RELATED TO WHETHER.
IS WHETHER A COVARIANT?

>>MANUELA HUSO: IN ESTIMATING
FATALITY ITSELF, IT DOES NOT NEED
TO BE.

IF WE WANT TO PREDICT FATALITY IT
CAN AND SHOULD BE.
IN ESTIMATING WHAT HAS HAPPENED,
THERE IS NO NEED FOR IT TO BE
BECAUSE WE ARE JUST BASICALLY
BASING OUR ESTIMATE ON WHAT WE
FIND.

IF WE FIND A LOT MORE BECAUSE THE
WEATHER IS IN THE SITUATION IN A
CONDITION THAT LEADS TO MORE
FATALITIES WE WILL FIND A LOT MORE
AND THAT'S REFLECTED IN OUR
ESTIMATE SO WE DON'T HAVE TO
TAKE WEATHER INTO ACCOUNT
DIRECTLY.

>> ANOTHER QUESTION WHAT IS
YOUR GENERAL STANCE ON PROJECT
OPERATORS VERSUS THIRD-PARTY
TRAINED BIOLOGIST?

>>MANUELA HUSO: I'M NOT SURE I
HAVE AN OPINION ON THAT.
WHAT I ASSUME IN DEVELOPING
THESE MODELS AND TRYING TO
COME UP WITH WAYS WE CAN
INTERPRET WHAT WE FIND INTO

WHAT LIKELY WAS TO HAPPEN I BELIEVE THAT WHOEVER IS DOING THE WORK IS SINCERE AND WELL TRAINED AND THEY KNOW HOW TO GO ABOUT SEARCHING AND HOW TO IDENTIFY THE CARCASSES.

SO THE SOURCE OF THEM, OF THEIR PROFESSION, I DON'T KNOW THAT MATTERS.

>>CHRISTY JOHNSON-HUGHES: I THINK THAT IS A GOOD POINT. FROM THE FISSION WHAT LIFE SERVICE PERSPECTIVE, I UNDERSTAND THE CONCERN ABOUT INCIDENTAL MONITORING AND MAYBE HAVING NON-INCIDENTAL MONITORING WHICH IS THE POST CONSTRUCTION STUDIES. I CAN UNDERSTAND THAT. THAT CAN LEAD TO VERY VALUABLE INFORMATION.

THEY TO IT LEAST ONE YEAR OF PRECONSTRUCTION STUDIES AND THEN FOLLOW UP WITH INCIDENTAL MONITORING AND WE HAVE SEEN WHERE STAFF WHO WORK AT THE FACILITY CAN BE VERY WELL TRAINED TO IDENTIFY CARCASSES AND EVEN IF THEY CAN'T IDENTIFY THE SPECIES, THEY HAVE A PROTOCOL IN PLACE FOR COLLECTING THOSE CARCASSES AND PRESERVING THEM, USUALLY IN A FREEZER UNTIL A QUALIFIED BIOLOGIST CAN COME AND DO THE ACTUAL SPECIES IDENTIFICATION SO I DON'T KNOW IF THE DATA WOULD BE ROBUST ENOUGH ON INCIDENTAL ON THE TRAINED TO DO FATALITY ESTIMATIONS, BUT IT MIGHT BE USEFUL FOR LONG-TERM UNDERSTANDING OF WHAT MIGHT BE GOING ON AT THE SITE.

>>MANUELA HUSO: THANK YOU I THINK I MISUNDERSTOOD THE QUESTION.

THE INCIDENTAL PART WAS THE PART I DID NOT QUITE CATCH.

FOR US TO ESTIMATE FATALITY WE DO NEED TO HAVE AS I SAID IN MY TALK, WE NEED TO HAVE A SENSE OF HOW LONG IT'S BEEN SINCE THAT AREA WAS LAST SEARCHED.

INCIDENTAL MONITORING DOES NOT REALLY HAVE THAT SO WE DON'T HAVE ANY WAY OF ESTIMATING WHAT THE PROBABILITY THAT CARCASS HAVING PERSISTED SINCE ITS BEEN KILLED BECAUSE WE DON'T HAVE A FRAME OF REFERENCE TO KNOW PROBABLY WAS NOT THERE IN THE LAST ONE.

WITHOUT THAT, IT MIGHT GIVE US A LITTLE BIT OF A SENSE OF PATTERNS, BUT WE CAN TRULY ESTIMATE FATALITIES FROM INCIDENTAL.

>>CHRISTY JOHNSON-HUGHES: THAT MAKES SENSE.

ANOTHER QUESTION, CAN FAKE BATS BE USED FOR SEARCHER EFFICIENCY TRIAL INSTEAD OF THE USUAL MICE?

>>MANUELA HUSO: I DON'T KNOW. THAT IS A GOOD QUESTION TO ASK AND DO SOME RESEARCH AND SEE IF THEY HAVE THE SAME KIND OF SEARCHER EFFICIENCY ASSOCIATED WITH THEM AS WE WOULD HAVE WITH REAL TRUE BATS.

AND WHETHER THEY ARE BETTER THAN MICE.

BUT I DON'T KNOW.

>>CHRISTY JOHNSON-HUGHES: FAKE BATS DO NOT HAVE THE SAME SENSE.

>>MANUELA HUSO: SEARCHER EFFICIENCIES, BUT FOR HUMANS IT'S PROBABLY NOT A BIG DEAL BUT THERE IS NOTHING ELSE MAYBE THAT'S AS GOOD AS IT WILL GET BUT THAT'S A GOOD QUESTION.

>>CHRISTY JOHNSON-HUGHES:

THANK YOU VERY MUCH.
WHAT WE WOULD LIKE TO DO IS MOVE
INTO A FIVE MINUTE BREAK AT THIS
POINT IN TIME AND REMEMBER, ON
OUR WEBSITE TYPE IN THE
QUESTIONS AND WE WILL BE MOVING
ON TO SOME OTHER TRANSPORT
ISSUES AFTER THE BREAK AND I
WOULD LIKE TO THANK MANUELA FOR
JOINING US TODAY.
THANK YOU VERY MUCH.

I THINK THIS IS VALUABLE FOR OUR
AUDIENCE.

AFTER THE FIND A MINUTE BREAK
WE WILL COME BACK TO THEIR
ROUND TABLE AND ANSWER MORE OF
YOUR QUESTIONS ABOUT TIER 4
REPORTING, COMMUNICATIONS AND
ADAPTIVE MANAGEMENT.

>>CHRISTY JOHNSON-HUGHES: ALL
RIGHT WHILE WE ARE BACK WITH
ANOTHER SET OF GUESS.

LET'S CONTINUE OUR DISCUSSION
ABOUT TIER 4 AND THEY'RE ARE A
LOT IN TIER 4 TO COVER SO WE
APPRECIATE YOU ARE HANGING WITH
US AND WE HAVE A LOT TO COVER
TODAY.

BUT I WOULD LIKE TO DO NOW IS
INTRODUCE OUR NEXT SET OF GUESS
AND WE HAVE JEFF EFFORT FROM
THE U.S. FISH AND WILDLIFE SERVICE.
WELCOME JEFF.

YOU HAVE SEEN JEFF BEFORE.
HE JOINED US ON OUR FIRST
BROADCAST AND HE IS ACTUALLY
HERE IN THE STUDIO WITH US.
AND HE IS A WILDLIFE BIOLOGIST IN
PORTLAND, OREGON WHERE HE
SPECIALIZES IN RENEWABLE ENERGY
PROJECT DEVELOPMENT AND
COORDINATION AND HE FOCUSES ON
COOPERATIVE DEVELOPMENT OF
AVIAN DATA PROTECTION PLANS AND
EAGLE CONSERVATION PLANS.

HE ALSO WORKS WITH OVERRIDE OF ENERGY ARENAS INCLUDING GEOTHERMAL, OCEAN RENEWABLE ENERGY PROJECTS AND TRANSMISSION INFRASTRUCTURE PROJECTS.

WELCOME.

AND THEN WE HAVE JERRY WHO IS FROM [INAUDIBLE] RENEWAL WILL.

WELCOME TO THE SHOW.

YOU ARE A WILDLIFE PERMITTING SCIENCE MANAGER AND YOU HAVE SPENT QUITE A BIT OF TIME IN THE ENERGY INDUSTRY AND EUPHORIC DONE THE AVIAN AND BATS PROTECTION POLICY OF THE COMPANY TO MEET COMPLIANCE COMMISSIONS AND DIRECTING STUDIES AT THE PROJECTS AND ALSO A MEMBER OF THE WILDLIFE WORKING GROUP FOR THE NATIONAL COLLABORATIVE AND A BOARD MEMBER FOR THE RENEWABLE ENERGY WORKING GROUP OF THE WILDLIFE SOCIETY.

WELCOME.

AND CERTAINLY NOT LEAST, IS JILL BIRCHELL THE U.S. FISH AND WILDLIFE SERVICE BUT JILL IS THE SPECIAL AGENT IN CHARGE OF THE U.S. FISH AND WILDLIFE SURFACE OFFICE OF REINFORCEMENT AND THAT INCLUDES CALIFORNIA AND NOW VIA AND SHE HAS BEEN A SERVICE OFFICER FOR 28 YEARS AND SHE HAS WORKED IN FIVE DIFFERENT FISH AND WILDLIFE SERVICE REGIONS AND SHE HAS DEALT WITH INDUSTRY ON ISSUES FROM BIRD ELECTRIC YOU SHOULDN'T IN ALASKA TO WIND INDUSTRY IN THE SOUTH WEST AND WORKING ON WIND AND SOLAR ISSUES IN CALIFORNIA AND NEVADA SO WELCOME.

GLAD YOU COULD JOIN US.

>> GOOD TO BE HERE.

>>CHRISTY JOHNSON-HUGHES:
NOW WE HAVE OUR EXPERTS WE
WANT TO CONTINUE OUR DISCUSSION
BECAUSE IT'S NOT JUST SEARCHING
FOR CARCASSES AND ESTIMATING
HOW MANY MAY OR MAY NOT HAVE
BEEN FOUND AND SEARCHER
EFFICIENCY EVEN THOUGH THAT'S AN
IMPORTANT COMPONENT OF THAT
THERE'S MORE TO IT THEN THAT.
WHAT DO YOU DO ONCE YOU FIND
THESE CARCASSES?
HOW DO YOU COORDINATE WITH THE
OTHER STAKEHOLDERS INVOLVED?
I THINK THAT IS ONE OF THE MOST
COMMON QUESTIONS AND THE WIND
ENERGY GOT BEEN SPENT A LOT OF
TIME TALKING ABOUT THE
COMMUNICATION WITH THE SERVICE
AND ANYONE ELSE WORKING ON THIS
SO LET'S TALK A LITTLE BIT ABOUT
COMMUNICATIONS.
WE HAVE -- COMMUNICATION IS A
VERY GENERAL TERM, BUT I THINK
THAT IT INVOLVES MUCH MORE THAN
JUST PICKING UP THE PHONE AND
SAYING HELLO TO SOMEONE.
SO JEFF, IN YOUR EXPERIENCE AS A
FISH AND WILDLIFE SERVICE
BIOLOGIST WORKING IN THE FIELD,
WHAT DOES COMMUNICATIONS MEAN
TO YOU UNDER THE WIND ENERGY
GUIDELINES?

>> AS IT RELATES TO TIER 4
COMMUNICATION IS EVERY BIT AS
CRITICAL AS IT IS IN THE FIRST THREE
TIERS OF DEVELOPMENT AND
APPLICATION IN THE WIND ENERGY
DEADLINE.
COMMUNICATION IS A FUNDAMENTAL
THEME THROUGHOUT THE
GUIDELINES AND WHEN IT COMES TO
ESTABLISHING A TRUSTWORTHY
PARTNERSHIP BETWEEN THE

SERVICE AND THE DEVELOPERS THAT ARE TRYING TO IMPLEMENT SUCCESSFUL PROJECTS, COMMUNICATION IS A FUNDAMENTAL PART TO MAKING SURE THE DYNAMIC BACK-AND-FORTH EXCHANGE OF INFORMATION IS WORKING AND EFFECTIVE.

THAT RELATIONSHIP IN MY EXPERIENCE NEEDS TO BE BUILT ON TRUST AND IN TIER 4 WHEN IT COMES TO THE COMMUNICATIONS BACK AND FORTH WITH THE COMPANY.

THE COMPANY CAN TRUST US AS SERVICE BIOLOGISTS TO RELAY BACK OUT TO THE FIELD AND THE PROJECT DEVELOPERS NEW OPPORTUNITIES FOR MITIGATION AND NEW ADVANCES IN THE AVOIDANCE OF MINIMIZATION OR POTENTIALLY NEW WAYS TO OPERATE A SUCCESSFUL PROJECT.

AT THE SAME TIME,, IF THE COMPANY APPROACHES US WITH A FATALITY REPORT OR POTENTIALLY A CHANGE IN OPERATIONAL MANAGEMENT, DIFFERENT THINGS LIKE THAT, IT IS BACK-AND-FORTH.

ULTIMATELY WHAT IT ALLOWS US TO DO IS MAKE BETTER DECISIONS AND INFORM FUTURE ADAPTIVE MANAGEMENT PROCESSES.

>>CHRISTY JOHNSON-HUGHES:

THAT IS REALLY HELPFUL ESPECIALLY AS WE LOOK AT THIS AS AN ONGOING PROCESS NOT JUST A STATIC PROCESS, NOT JUST SOMETHING WE DO IT THE BEGINNING AND WE ARE DONE.

IT IS A CONTINUUM OF COMMUNICATION AND DIFFERENT TYPES OF COMMUNICATION.

LIKE YOU SAID, IT HELPS US TO MOVE FORWARD.

IF SOMETHING DOES COME UP WE DID NOT ANTICIPATE.

I WOULD LIKE TO MOVE TO YOU
JERRY AND THE SAME SORT OF
QUESTION, YOU ARE WITH INDUSTRY,
WHAT DOES COMMUNICATIONS MEAN
TO YOU AS AN INDUSTRY
REPRESENTATIVE?

>> ONE OF THE KEY FEATURES AND
JEFF EXPLAINED IT PRETTY WELL IS
YOU REALLY HAVE TO LOOK AT HOW
YOU COMMUNICATE AND THE
CONFIRMATION OR IF THERE ARE
ISSUES ASSOCIATED WITH THE TIER 4
DATA DID YOU MEET THE TIER THREE
EXPECTATIONS AND CAN YOU
CONFIRM THAT AND THIS IS A 30 YEAR
PROCESS WITH WHAT YOU ARE
ALLUDING TO THAT IT'S A KEY
FEATURE OF THE ADAPTIVE
MANAGEMENT IS DEALING WITH THE
REAL WORLD WITH TIER 4 IS WHERE
WE START TO SEE THE REALITY OF
WHAT WE'VE BUILT AND WE ARE
TRYING TO OPERATE.

ONE OTHER FACET ASSOCIATED WITH
THAT IS KNOWING THE
STAKEHOLDERS AND DEVELOPING IF
YOU WILL, AND ESTABLISHING
CHANNELS FOR THAT TYPE OF
COMMUNICATION.

LIKE YOU'VE ALLUDED TO, THERE'S A
LOT OF DIFFERENT TYPES OF
COMMUNICATIONS AND YOU NEED TO
WORK WITH STAKEHOLDERS TO FIND
OUT WHAT'S THE BEST WAY TO
COMMUNICATE AND TO ENSURE THE
INFORMATION IS THERE SO YOU CAN
WORK ON MUTUAL SOLUTIONS AND
WORK TO DEAL WITH THOSE
LONG-TERM ASPECTS OF
OPERATIONS AND ULTIMATE
RESOURCE MANAGEMENT.

>>CHRISTY JOHNSON-HUGHES: YOU
DO BRING UP A GOOD POINT IT'S NOT
JUST ABOUT WHAT THE FISH AND
WILDLIFE SERVICE WANTS TO SEE

BECAUSE WE MIGHT HAVE ONE WAY OF COMMUNICATING THAT WE ARE MOST COMFORTABLE WITH. BUT THERE MAY BE AN ALTERNATIVE OR EVEN BETTER WAY OF COMMUNICATING WITH THE PROJECT MANAGER, THE COMPANY WHEN IT COMES TO THIS AND THAT IS A REALLY GOOD POINT. IS ESTABLISH HOW YOU -- WHERE ARE THE BEST METHODS.

>> ANOTHER REASON AT LEAST IN OUR SITUATION RECOVER A NUMBER OF U.S. FISH AND WILDLIFE SERVICE REGIONS AND THEY HAVE CERTAIN AUTONOMY'S AND RELATIONSHIP SO IT'S IMPORTANT TO GET INTO THOSE AND UNDERSTAND THE CIRCUMSTANCES AND THE SITUATIONS AND MAKE SURE YOU ARE GETTING THE RIGHT INFORMATION.

>>CHRISTY JOHNSON-HUGHES: EXCELLENT. NOW CHILL, AS LAW ENFORCEMENT, COMMUNICATION CAN MEAN COMPLETELY A DIFFERENT THING OR IT FEELS LIKE IT, BUT REALLY, IN THE GUIDELINES WE TALK A LOT ABOUT DOCUMENTATION AND THE PRESERVATION OF THE DOCUMENTATION SHOWING THE ACTIONS, THE RISK ASSESSMENTS THAT WERE CONSIDERED AND TAKEN BY THE COMPANY.

WHAT DOES THAT MEAN TO YOU AS A LAW ENFORCEMENT OFFICER?

>> I THINK FOR OUR PURPOSES, COMMUNICATION IS A LOT MORE THAN JUST PICKING UP THE PHONE AND CALLING FISH AND WILDLIFE SERVICE.

IN FACT,, I THINK SOMETIMES THAT IS WHAT A COMPANY MAY FEEL IS ADEQUATE AND THEY CAN CHECK A

BOX AND SAY THEY'VE
COMMUNICATED WITH FISH AMOUNT
OF SERVICE AND THEY'VE MET THAT
PARTICULAR REQUIREMENT, BUT IT IS
A LOT MORE IMPORTANT TO
EXCHANGE INFORMATION BETWEEN
THE COMPANY AND THE U.S. FISH AND
WILDLIFE SERVICE AND I CAN'T
STRESS ENOUGH THAT NEEDS TO
HAPPEN AS EARLY AS POSSIBLE IN
THE PROCESS.

THIS EVENT THE COMPANY
ESTABLISHES THAT RELATIONSHIP
WITH THE U.S. FISH AND WILDLIFE
SERVICE BIOLOGIST AND STARTS
GETTING THAT INPUT AND
INCORPORATING THE FEEDBACK INTO
THEIR PROJECT CITING AND THEIR
PROJECT DEVELOPMENT PLANS AND
THEN SHARING INFORMATION ABOUT
SURVEY RESULTS BOTH
PRECONSTRUCTION AND
POST- CONSTRUCTION AND THEN
ALSO PICKING UP THE PHONE AND
MAKING THE HARD PHONE CALL
WHEN THEY HAVE SOMETHING TO
REPORT.

SPECIES OF CONCERN IS KILLED OR
THERE'S A SIGNIFICANT EVENT
INVOLVING SEVERAL BIRDS, FOR
EXAMPLE.

THE MORE OFTEN AND THIS CAN'T BE
STRESSED ENOUGH FREQUENT AND
EARLY CONVERSATIONS BETWEEN
THE COMPANY AND THE SERVICE ARE
VERY IMPORTANT TO MAKE THE
WHOLE PROCESS A LOT SMOOTHER
AND LESS PAINFUL FOR THE
COMPANY.

>> .
>>CHRISTY JOHNSON-HUGHES:
ABSOLUTELY I BELIEVE THE WIND
ENERGY GUIDELINES TO TALK ABOUT
THAT.
THERE IS AN ADMINISTRATIVE

RECORD THAT NEEDS TO BE TAPPED BY THE COMPANY -- KEPT BY THE COMPANY SO IF THERE ARE ANY QUESTIONS EVERYONE CAN GO BACK TO THAT RECORDS AND SAY THESE WERE THE CHOICES MADE.

THIS IS HOW THEY DECIDED TO MOVE FORWARD AND HERE'S HOW THEY CAME TO THE SERVICE AND ON THE FLIPSIDE, THE SERVICE ALSO NEEDS TO HAVE A GOOD ADMINISTRATIVE RECORD AS WELL.

EVEN THOUGH IT IS OFTEN EASIER TO JUST JOT OFF A QUICK E-MAIL OR PICK UP THE PHONE REAL QUICK, SOMETIMES WE NEED TO FOLLOW UP WITH AN ACTUAL LETTER OR MEMO OR SOMETHING TO DOCUMENT THE EXCHANGE.

SO IF THERE ARE ANY QUESTIONS WE CAN ALWAYS REFER BACK TO THAT INTERNALLY AND COMPARE THOSE NOTES WITH WHAT THE COMPANY HAS KEPT.

AT LEAST THAT'S BEEN MY EXPERIENCE.

>>CHRISTY JOHNSON-HUGHES: --

>> ABSOLUTELY.

>>CHRISTY JOHNSON-HUGHES:

LET'S MOVE ONTO ANOTHER ELEMENT OF TIER 4 I WOULD LIKE TO TALK ABOUT AND I MENTIONED IT EARLIER IN MY PRESENTATION, IS THAT TIER 4 NOT ONLY TALKS ABOUT DEAD THINGS, BUT ALSO TALKS ABOUT HABITAT AND IMPACTS TO HABITAT AND I THINK THIS IS ONE OF THE MOST EXCITING THINGS PROBABLY FROM THE FISH AND WILDLIFE SERVICE SCIENCE REALM IS WHERE WE HAVE ACTUALLY PUT INTO WORDS THE OPPORTUNITIES TO LOOK AT HABITAT LOSS AND FRAGMENTATION AND DISTRUCTION, DEGRADATION, WHATEVER YOU

WANT TO CALL IT AND THIS IS NOT JUST A WIND ENERGY THING. IT'S A LANDSCAPE LEVEL THING. WE LOOK AT IT FROM A VARIETY OF DIFFERENT IMPACTS, BUT THIS IS THE FIRST TIME WE'VE HAD AN OPPORTUNITY TO WRITE THIS DOWN AND PUT THESE QUESTIONS TO THE TEST SO WE TALK ABOUT HABITAT AND THE REVIEW OF HABITAT IN THE GUIDELINES AND POTENTIAL MITIGATION.

SO WHEN I TAKE A LOOK AT THIS, THAT SOUNDS GREAT.

BUT IN REALITY WHAT DOES THAT MEAN ON THE GROUND.

JEFF I WOULD LIKE TO GO BACK WITH YOU AS A SERVICE BIOLOGIST AND WHAT ARE YOUR IMPRESSIONS OF THE HABITAT IMPACT AND HOW DO YOU LOOK AT THAT?

WHAT ARE YOUR IDEAS ON IT?

>> PRIMARILY WITH WIND AND/OR G.

PROJECTS THIRD TWO TYPES OF HABITAT IMPACT WE ARE CONCERNED WITH THE DIRECT IMPACT WHICH IS THE DIRECT AND IMMEDIATE IMPACTS TO THE HABITAT IN THE AREA SURROUNDING THE PROJECT THAT IS LOST TO THE PROJECT DEVELOPMENT.

THINGS LIKE THE TURBINES, ACCESS ROADS AND OTHER THINGS.

GENERALLY SPEAKING THOSE IMPACTS TEND TO BE RELATIVELY SMALL COMPARED TO THE FOOTPRINT OF THE ENTIRE PROJECT AREA.

POTENTIALLY ON A LARGER SCALE, INDIRECT HABITAT IMPACTS ARE CONSIDERABLY MORE A SOURCE OF CONCERN WHEN YOU HAVE VERY TALL STRUCTURES ON A RELATIVELY FLAT LANDSCAPE OR HAVE SOMETHING THAT GENERATES A LOT

OF NOISE THAT MAYBE IN DIRECT
IMPACT FOR A VARIETY OF SPECIES.
SO MOST OF THE TIME WHEN WE
TALK ABOUT HABITAT IMPACTS WE
TALK ABOUT BIRDS BUT THINGS WE
WOULD TAKE INTO CONSIDERATION IN
THE EARLIER TIERS ARE POTENTIALLY
FRAGMENTING HABITATS FOR BIG
GAME WINTER RANGE OR MIGRATION
CORRIDORS OR OTHER CRITICAL
HABITAT WE'VE NOT REALLY -- THAT
WE DON'T ALWAYS TAKE INTO
CONSIDERATION WHEN WE HAVE
SOMEWHAT OF A CLOSE SCOPE ON
BIRDS OR THINGS THAT WOULD BE
FLYING THROUGH THE TURBINES.
SO TIER 4 GIVES US A GOOD
OPPORTUNITY AS PART OF OUR POST
CONSTRUCTION IMPACT
ASSESSMENT TO VALIDATE WHAT
WE'VE LEARNED AND WHAT WE SAW
IN THE FIRST THREE TIERS OF
PROJECT DEVELOPMENT AND MAKE
SURE FROM THE HABITAT POINT OF
VIEW WE'VE GOT THINGS RIGHT.

>>CHRISTY JOHNSON-HUGHES: I
THINK THAT IS A VERY IMPORTANT
ELEMENT THAT WE HAVE THAT
OPPORTUNITY TO INVESTIGATE.
AS WE ARE SEEING IN GENERAL, WE
NEED TO CONSIDER THESE
LANDSCAPE LEVEL ISSUES AND
THESE HABITAT ISSUES LIKE YOU
SAID FOR EVEN LAND-BASED LARGE
GAME SPECIES.

JERRY, IN THE INDUSTRY, HOW DOES
THE INDUSTRY THINK ABOUT THIS
AND WHAT HAVE BEEN YOUR
EXPERIENCES WITH THE HABITAT
IMPACT QUESTION OF TIER 4?

>> A LOT OF THE EFFORT IS
FOCUSED ON AVOIDANCE
ESPECIALLY CRITICAL HABITATS FOR
DEPENDING ON THE PROJECT THE
CIRCUMSTANCES.

BUT IN THE CASES OF DIRECT LOSS,
THERE'S A VARIETY OF MITIGATION
MEASURES INSTITUTED WITH
ACQUISITIONS, CONSERVATION AND
MITIGATION BANKS.
A VARIETY OF MEASURES TO SECURE
THAT REPLACEMENT HABITAT.
THAT IS WHAT THE DIRECT LOSS.
THE DEGRADATION CERTAINLY
DEPENDS ON THE SITE AND THE
SPECIES AS JEFF WAS ALLUDED TO
THAT ARE PRESENT BUT A LOT MORE
DIFFICULT TO DETERMINE AND A LOT
OF THE 4 BE STUDIES ARE INGRAINED
AND HAVE LIMITATIONS WAS TRYING
TO GET A GENERAL FEEL IF THERE'S
SOMETHING HAPPENING, BUT WITH
SOME OF THE SPECIES LIKE SAGE
GROUSE ETC. THEY ARE BETTER
SUITED FOR THE TIER FIVE WORK OR
COLLABORATIVE RESEARCH WORK
SO YOU CAN USE THAT INFORMATION
IN A CONTROLLED SENSE AND NOT
COMPOUNDED BY A SERIES OF
DIFFERENT ITEMS SO IT'S TRY TO
ESTABLISH THAT.
AND SOMETIMES WHAT WE'VE DONE
IS WE'VE MADE ASSUMPTIONS ON
WHAT WE THINK THE DEGREE AND
AFFECT OR LOSS WILL BE.
WE'VE MADE THAT A FACTOR IN OUR
OVERALL LOSS MITIGATION EFFORT.
>>CHRISTY JOHNSON-HUGHES:
THAT'S A VERY VALUABLE POINT
BECAUSE A LOT OF US WE DON'T
NECESSARILY KNOW HOW THE
ANIMALS MAY REACT TO THIS
OCCURRENCE ON THE LANDSCAPE AS
WE HAVE SEEN WITH SAGE GROUSE.
THERE WERE SOME IMPACTS WE DID
NOT NECESSARILY ANTICIPATE BUT
THEN ON THE OTHER HAND, THIS IS
ALSO LARGER SCALE SO MAY BE
DIFFICULT TO DO PROJECT BY
PROJECT BUT IF WE LOOK AT IT IN A

LARGER SENSE, THERE MAY BE EVEN MORE OPPORTUNITIES.

>> AND TRYING TO CONTROL FOR VARIABLES AND PUT A PROJECT UP AND SAY THAT IS THE FACTOR THAT CAUSED THE EFFECT, THERE COULD BE OTHER FACTORS GOING ON OR YOU COULD HAVE SOME WEATHER ISSUES THAT MAY RESULT AT LEAST WITH CHICKENS IT COULD BE A BIG FACTOR.

SO THERE ARE A NUMBER OF THINGS THAT MAY CONFOUND WHAT YOU TRY TO DO IN THE STUDIES.

IT DOES NOT MEAN YOU DON'T DO SOME THINGS ARE TO GET A FEEL FOR THAT, BUT TO ME IT'S A REAL TIER 5 COMPONENT.

>>CHRISTY JOHNSON-HUGHES: I'D LIKE TO MOVE ONTO ANOTHER QUESTION.

AND THIS ONE ACTUALLY I KNOW ALSO GETS TO THE HEART OF A LOT OF QUESTIONS FOR MANY PEOPLE AND THIS IS REPORTING OF FATALITIES.

AND HOW THIS IS HANDLED BY INDUSTRY.

I KNOW THERE IS A LOT OF DISCUSSION ABOUT IT AT THE FIELD LEVEL AND THERE IS SOME SUPPOSITION ABOUT WHAT HAPPENS.

THERE'S ALSO SOME REALITY OF WHAT HAPPENS.

SO JERRY, I WOULD LIKE TO THROW THIS BACK AT YOU AGAIN AS AN INDUSTRY PERSON, HOW DO YOU HANDLE DEAD THINGS, YOU COME UP TO A TURBINE AND THERE IS A DEAD BIRD, BAT, HOW DO YOU HANDLE THAT?

>> ONE THING I WANT TO POINT OUT, I REALLY WANT TO TELL JILL HOW MUCH I HAVE APPRECIATED HER BEING ABLE TO SIT DOWN AND TALK

THROUGH SOME OF THESE
DISCUSSIONS ABOUT HOW TO
HANDLE THIS.
REALLY INFORMATIVE.
FROM THE STANDPOINT OF THE
INDUSTRY, ACTUALLY WE PROVIDE
REPORTS OF OUR POST
CONSTRUCTION FATALITY SERVICE IS
ONE COMPONENT.
ANOTHER'S INDIVIDUAL INSTANCES,
BUT WE ARE ALWAYS BALANCING
THOSE WITH THE TENSION OF THE
LEGAL ASPECT.
SO WE PREPARE REPORTS WITH
FATALITY ESTIMATES THAT FULFILL A
SERIES OF MIGHT BE INTERNAL
POLICIES WITH IBERDROLA BUT
THOSE POST CONSTRUCTION
FATALITY STUDIES ARE CONDUCTED
HOPEFULLY FOLLOWING THE WIND
BATTERED JEEP GUIDELINES AND
SUITABLE PROTOCOLS AND MADE UP
RUN 1-3 YEARS DEPENDING ON THE
PROTOCOLS WHERE YOU ANALYZE
THE INFORMATION AND COMPARED
AND THE KEY IS THE COMPARISON
BACK TO TIER THREE OR THE
REGIONAL NORMS.
ARE YOU SEEING WHAT YOU
EXPECTED AND PREPARED IN A
REPORT AND THAT IS PROBABLY THE
MAJOR WAY THAT WE TRY TO
PROVIDE FATALITY INFORMATION BUT
THERE'S ALSO THIS INCIDENT ASPECT
AND THAT CAN BE LONG TERM
BECAUSE THAT COULD BE A FACET
THAT GOES ON FOR THE LIFE OF THE
PROJECT, 30 YEARS WERE YOU DEAL
WITH EVENTS AND THOSE EVENTS
COULD BE STATE, FEDERAL, THEY
COULD BE EAGLES OR THEY COULD
BE RARER EVENTS LIKE A LARGE
FATALITY OR SOMETHING LIKE THAT
WHERE WITH THAT DISCOVERY VIEW
REPORT THAT TO THE APPROPRIATE

STATE OR FEDERAL AGENCY AND THAT GOES BACK TO COMMUNICATION CHANNELS BUT IT'S DONE IN A MUCH MORE URGENT BASIS, 24-48 HOURS IS PROBABLY THE NORM WE TRY TO WORK WITH.

>>CHRISTY JOHNSON-HUGHES: YOU MENTIONED TALKING TO JILL AND IT IS TRUE, JILL, YOU HAVE A REALLY GOOD WAY OF EXPLAINING THE PROTOCOLS.

SO IF YOU WOULD NOT MIND, IF YOU WOULD GO INTO A LITTLE BIT MORE ABOUT FATALITY REPORTING FROM YOUR PERSPECTIVE.

>> AS JERRY MENTION, THERE ARE KIND OF TWO WAYS TO LOOK AT FATALITY REPORTING.

YOU HAVE YOUR SORT OF ANNUAL REPORTS PROVIDED TO THE VARIOUS GOVERNMENT AGENCIES WHETHER FEDERAL STATE OR LOCAL AS REQUIRED BY PERMITS FOR THE COMPANY POLICY.

THOSE ARE IMPORTANT.

BUT THERE IS ALSO THE INCIDENT REPORTING AND I THINK FOR LAW ENFORCEMENT IT'S VERY IMPORTANT WE ARE BROUGHT INTO THE LOOP FOR THOSE KINDS OF INCIDENTS.

FOR EXAMPLE, ENDANGERED SPECIES, EAGLES, MASS MORTALITIES, AND WE WILL BE BROUGHT IN ONE WAY OR THE OTHER AND I THINK IT'S PLAYED OUT OVER TIME THAT COMPANIES THAT REPORT DIRECTLY TO US OR TO THE LOCAL BIOLOGIST WHO SHARES INFORMATION WITH US IF THERE'S THAT KIND OF RELATIONSHIP ESTABLISHED AHEAD OF TIME AND THERE'S THE SHARING OF INFORMATION, WE KNOW WHERE THE COMPANY IS IN DEALING WITH THE SERVICE AND THE INCIDENT REPORTS

DON'T HAVE THE NEGATIVE IMPACT THAT THEY MIGHT OTHERWISE IF THIS IS A COMPANY THAT THIS IS THE FIRST TIME WE HEAR FROM THEM IS WHEN THERE'S A MASS MORTALITY FOR EXAMPLE, AND WE HEAR FROM AN NGO OR WE DISCOVER IN OURSELVES, THEN IT'S CLEARLY A LAW-ENFORCEMENT MATTER AND WE WILL START DIGGING IN AND WE START FROM THE BEGINNING LOOKING AT ADMINISTRATIVE RECORD AND THE WHOLE HISTORY OF THE PROJECT AND THE EFFORTS THAT HAVE BEEN MADE.

SO REPORTING I KNOW CAN BE SORT OF TRICKY FOR COMPANIES, BUT IT REALLY IS, AND IT'S CERTAINLY BEEN MY EXPERIENCE IN MANY COMPANIES WILL ATTEST TO THIS, IT IS BETTER TO REPORT YOURSELF THAN HAVE SOMEBODY ELSE REPORT OR HAVE LAW ENFORCEMENT FIND OUT THEMSELVES BECAUSE THEN THERE WILL BE A FULL-BLOWN INVESTIGATION AND EVERYTHING THAT COMES WITH THAT.

>>CHRISTY JOHNSON-HUGHES:
ABSOLUTELY.

I KNOW YOU AND I HAVE TALKED WHILE WE HAVE BEEN PREPARING FOR THIS BROADCAST AND I THINK IT IS INTERESTING THAT LAW ENFORCEMENT HAS SUCH A BROAD ROLE.

IT'S BROADER THAN WE ACTUALLY REALIZE.

YOU DON'T JUST NECESSARILY COME IN WHEN SOMETHING IS HAPPENED AND SOMEONE HAS CALLED SHOOT YOU CAN PLAY A LARGER ROLE IN INTERACTING.

>> EXACTLY WE TRY TO DO THAT ESPECIALLY WITH WIND BECAUSE WITH THE ELECTRIC UTILITY

INDUSTRY FOR EXAMPLE, THERE ARE WAYS TO FIX PROBLEMS IF THEY ELECTROCUTE A BIRD, THERE ARE RETROFIT MEASURES THAT CAN BE PUT IN PLACE.

CERTAINLY FROM THE BEGINNING THEY CAN INSTALL BIRD FRIENDLY EQUIPMENT WHICH HELPS MINIMIZE AND AVOID THOSE KINDS OF TAKES. BUT WITH WIND, AS WE ALL KNOW, ONCE THEY ARE INSTALLED, THERE'S NOT A LOT THAT CAN BE DONE.

IT IS SO IMPORTANT FOR COMPANIES TO DO WHAT THEY CAN UP FRONT. THEIR OPTIONS ARE A LOT BROADER RANGING IF THEY WORK WITH THE SERVICE DURING THEIR CITING DETERMINATIONS, DURING THEIR DESIGN IMPLEMENTATION AND SO WE AND LAW ENFORCEMENT TRY TO BRING TO THEIR ATTENTION EVEN BEFORE THEY BUILD THAT WE UNDERSTAND YOU ARE LOOKING AT BUILDING THIS PROJECT AND YOU NEED TO GET AHEAD OF OUR BIOLOGIST.

WE TRY TO GET AHEAD OF THAT BECAUSE IT IS SO IMPORTANT IN TERMS OF WHAT IS AVAILABLE TO THEM FOR REMEDIATION WANTS TURBINES ARE UP AND SPINNING. THERE'S JUST NOT A WHOLE LOT THAT CAN BE DONE.

WE DO HAVE A VERY IMPORTANT ROLE I THINK IN HELPING TO EDUCATE COMPANIES AND TO PUT THEM ON NOTICE ABOUT THE POTENTIAL LOSS THAT COULD BE IN FOLKS IF THEY BUILD AND THEY IMPACT SPECIES OF CONCERN OR MIGRATORY BIRDS WHICH ARE FEDERALLY PROTECTED.

SO WE REALLY WANT THEM TO DO WHAT THEY CAN UP FRONT AND AVOID TO THE EXTENT POSSIBLE.

SO EDUCATION HAS BECOME A LARGE PART OF WHAT WE DO IN THIS CONTEXT.

>>CHRISTY JOHNSON-HUGHES:
EXCELLENT.
AND THANK YOU.

I THINK IT'S VERY IMPORTANT PEOPLE UNDERSTAND THAT BROADER ROLE.

JEFF, AGAIN AS A SERVICE BIOLOGIST IN THE FIELD, WHEN TAKE OCCURS, WHAT HAPPENS, WHAT IS YOUR EXPERIENCE WHEN SOMETHING HAPPENS AND THE COMPANY CALLS YOU, HOW DO YOU HANDLE THAT?

>> MOST OF THE TIME WHAT HAS HAPPENED IN MY EXPERIENCE IS A COMPANY, FOR LACK OF A BETTER ANALOGY WINDS UP THE U.S. FISH AND WILDLIFE SERVICE PHONE TREE. I WILL GET A TELEPHONE CALL AND A SUPPLEMENTAL E-MAIL OFTEN WITH PICTURES OF THE EVENT AND AT THE SAME TIME, THE BIOLOGIST AT MY LEVEL RECEIVE THAT INFORMATION THEY ARE REACHING OUT TO THE LOCAL FIELD OFFICES AS WELL AS LAW ENFORCEMENT.

EVERYONE IS MADE AWARE OF WHAT HAS HAPPENED.

IF IT'S SOMETHING THAT NEEDS TO BE COLLECTED IT'S OUR FIELD OFFICE WERE ON FOR SMITH'S AT THE GOES OUT AND MAKES THE COLLECTION.

MOST OF THE COMPANIES I'VE HAD THE PLEASURE OF WORKING WITH HAVE BEEN FORTHRIGHT IN IMPLEMENTING EXACTLY WHAT JILL WAS DESCRIBING.

IT HELPS ALL OF US IN THAT CRITICAL COMPONENT OF THE TIERED APPROACH TO DOING ALL OF THIS WITH THAT POSITIVE FEEDBACK LOOP.

IF SOMETHING NEGATIVE MAY HAVE OCCURRED ON THE LANDSCAPE BUT

IT'S A TOOL FOR ALL OF US TO LEARN FROM, IDENTIFY A POTENTIAL SOURCE FOR DOING THINGS BETTER AND FEEDBACK INTO THAT ADAPTIVE MANAGEMENT LOOP AND MAKE BETTER DECISIONS ALL THE WAY THROUGH.

>>CHRISTY JOHNSON-HUGHES:
AGAIN WE COME BACK TO COMMUNICATION, BUILDING THAT RELATIONSHIP AND WORKING TOGETHER THROUGH THESE ISSUES. SO WHAT WE WOULD LIKE TO DO NOW IS TAKE A FEW QUESTIONS FROM OUR AUDIENCE.

I HAVE NOTICED A FEW QUESTIONS HAVE ROLLED IN. ONE OF THE FIRST QUESTIONS IS IS THERE A LIST OF SPECIES OF HABITAT FRAGMENTATION CONCERNED AND WE DO NOT HAVE NECESSARILY A LIST WRITTEN DOWN AT THIS POINT IN TIME.

WE ARE WORKING WITH STATE AGENCIES AND THE ASSOCIATION OF FISH AND WILDLIFE AGENCIES TO DEVELOP CRITERIA FOR PUTTING DOWN THESE SPECIES.

WE FIGURED THAT MOST WILDLIFE SERVICES AND BIOLOGIST HAVE A LIST OF SPECIES THAT ARE PARTICULARLY AT RISK FOR HABITAT FRAGMENTATION BUT THE SPECIES ARE NOT NECESSARILY DOCUMENTED IN THAT WAY.

IN ORDER TO DO A TIER 4 ANALYSIS, YOU NEED TO HAVE THAT LIST OF HABITAT FRAGMENTATION CONCERNS.

WE WILL TALK ABOUT THIS ISSUE IN A FUTURE BROADCAST.

IT MAY WELL BE THE NEXT BROADCAST WHICH WE ARE ANTICIPATING WILL BE AROUND THE JANUARY /FEBRUARY TIMELINE

WHERE WE CAN TALK FURTHER ABOUT THE CRITERIA AND THE DEVELOPMENT OF THIS LIST OF SPECIES OF HABITAT FRAGMENTATION CONCERNS. WHAT I WOULD LIKE TO DO NOW IS MOVE TO ANOTHER QUESTION. OFTEN PRECONSTRUCTION SURVEYS ARE DIFFERENT THAN POST- CONSTRUCTION AND FOCUS MORE ON SERVING SPECIES PRESENT. DO THESE SURVEYS NEED TO BE THE SAME? I THINK I WILL THROW THIS ONE AT JEFF FIRST. [CHUCKLING] AND I THINK YOU ARE CAPABLE OF HANDLING THIS QUESTION.

>> IN ORDER TO HAVE STATISTICALLY VIABLE DATA THAT CAN BE REALLY USED TO VALIDATE IN TIER 4 WHAT WE'VE DISCOVERED OR LEARNED IN THE FIRST COUPLE OF TIERS, THERE ARE SO SPECIFIC SEARCH PROTOCOLS, SOMETHING THAT MANUELA WAS SPEAKING ABOUT EARLIER THAT SHOULD BE USED TO PRODUCE DEFENSIBLE INFORMATION.

SO WHEN IT COMES -- IF THE PURPOSES ARE TO VALIDATE WHAT WE LEARNED IN THE EARLIER TIERS WITH LATER TIER SURVEY, TO HAVE THE SURVEYS DONE IN A WAY THAT IS DEFENSIBLE ACCORDING TO SPECIFIC PROTOCOL, WE CAN USE THAT TO VALIDATE A FATALITY MODELS, SOME OF THE SETTING RECOMMENDATIONS, SOME OF THE OPERATIONAL CONSIDERATIONS AND THAT SORT OF THING.

ALSO AS MANUELA WAS POINTING OUT EARLIER, IT SEPARATES THE INFORMATION WE LEARNED IN THOSE

STRUCTURED POST- CONSTRUCTION SURVEYS VERSUS WHAT WE FIND INCIDENTALLY WHICH IS VERY IMPORTANT TO SEPARATE ALL OF THAT OUT.

>>CHRISTY JOHNSON-HUGHES: ABSOLUTELY.

I THINK THAT IS VERY IMPORTANT. AND AGAIN THERE CAN BE DIFFERENCES IN PRE- AND POST- CONSTRUCTION BUT IF YOU ARE THINKING ABOUT POST- CONSTRUCTION, EVEN DURING PRECONSTRUCTION, EARLIER TIERS, THEN YOU WILL MAKE YOUR ANALYSIS EVEN STRONGER. SO I THINK THAT'S VERY HELPFUL. THANK YOU.

CAN YOU STILL COMPLETE TIER 4 WITH SIMPLY DOING FATALITY ESTIMATES SURVEYS?

AND, YOU KNOW, JERRY, WHAT DO YOU THINK ABOUT THAT QUESTION? CAN THEY JUST COMPLETE TIER 4 BY SIMPLY DOING FATALITY ESTIMATES SURVEYS?

>> A QUALIFIED YES.

I THINK AS JEFF HAS ALLUDED TO DEPENDING ON WHAT YOU'RE DEALING WITH FROM TIER 3, YOU HAVE TO LOOK AT WHAT YOUR PURPOSE IN THOSE FATALITY SURVEYS OR ANY OTHER SURVEY YOU ARE CONDUCTING OUT THERE AND THERE MAY BE A SITUATION WHERE YOU DON'T HAVE A LOT OF CONCERNS BUT WHAT YOU WANT TO DO IS GO IN AND VALIDATE WHAT YOUR EXPECTATIONS FROM TIER 3 WERE ON THE FATALITY LEVELS AND THAT MIGHT BE ADEQUATE FOR WHAT YOU ARE DEALING WITH. THERE MAY BE OTHER PROJECTS IN THE VICINITY YOU CAN USE TO LOOK AT AND CAN REINFORCE THAT.

SO YES BUT A QUALIFIED YES.

>>CHRISTY JOHNSON-HUGHES: I
THINK THAT IS FAIR.

THANK YOU VERY MUCH.

JEFF DID YOU HAVE ANYTHING YOU
WANTED TO ADD TO THAT?

>> I THINK JERRY COVERED IT.
A QUALIFIED YES.

[CHUCKLING]

>>CHRISTY JOHNSON-HUGHES:
THAT'S ALL RIGHT.

NON-OF THIS IS BLACK AND WHITE.

THIS IS ALL A LEARNING CURVE.

WE ARE ALL FIGURING THIS OUT.

WE ARE DOING IT TOGETHER AND

ESPECIALLY WITH SOME OF THE

PRE- AND POST- CONSTRUCTION

SURVEY QUESTIONS.

>> I WOULD LIKE TO POINT OUT
THAT NO TWO PROJECTS ARE THE
SAME.

EVERY PROJECT IS BUILT IN A
DIFFERENT HABITAT.

EVERY PROJECT DECIDED BASED ON
THE UNIQUE CHARACTERISTICS OF
THE FACILITIES AND THE COMPANY IS

ABILITY TO IMPLEMENT AND AVOID

AND EACH PROJECT IS DIFFERENT

AND THEREFORE, IT GIVES US A

UNIQUE CHALLENGE AS FAR AS

RESPONSIBLE SITING AND

IMPLEMENTATION AND OPERATION

BUT AT THE SAME TIME UNIQUE

OPPORTUNITIES TO PRACTICE

AVOIDANCE AND MINIMIZATION AND

TO REALLY GET THINGS DONE RIGHT

OF THE LANDSCAPE FROM A

CONSERVATION STANDPOINT.

>>CHRISTY JOHNSON-HUGHES:
THANK YOU.

MOVING ONTO THE NEXT QUESTION,
WHAT LEGAL RESPONSIBILITIES DOES
ONE FACILITY HAVE TO REPORT
VIOLATIONS OF THE MIGRATORY BIRD
TREATY ACT ALSO KNOWN AS MBTA

AND JILL, WOULD YOU LIKE TO TRY THAT ONE FIRST?

>> AS MOST PEOPLE KNOW BY NOW, ANY DEATH OF A MIGRATORY BIRD THAT IS CAUSED BY SOMETHING OR SOMEBODY IS TECHNICALLY A VIOLATION OF THE MIGRATORY BIRD TREATY ACT BECAUSE IT DOES STICK -- TRICK BOBBITT SAID OF THE BIRD DIES AND YOU CAUSE IT, YOU ARE GUILTY.

WE DON'T TREAT EVERY BIRD DEATH AS A VIOLATION.

THERE ACTUALLY IS NO BROAD REQUIREMENT THAT SOMEBODY REPORT AND IN THIS CASE WHEN THE FACILITIES REPORT BIRD DEATHS TO THE FISH AND WILDLIFE SERVICE.

HOWEVER,, DEPENDING ON WHAT STATE YOU'RE IN THERE'S USUALLY SOME SORT OF EITHER LOCAL, STATE OR FEDERAL PERMIT ASSOCIATED WITH THAT WIND FACILITY AND THEY MAY VERY WELL HAVE REPORTING REQUIREMENTS.

BUT YOU KNOW, AGAIN THERE'S NOT A REQUIREMENT TO REPORT SOMETIMES.

THE COMPANY HAS FOR EXAMPLE, A. FEDERAL PERMIT AND THERE ARE SOME REPORTING REQUIREMENTS UNDER THAT BUT THAT HAS MORE TO DO WITH THE BIRDS THEY'VE PICKED UP TO CONDUCT THEIR STUDIES OR WHATEVER.

IT IS USEFUL TO KEEP TRACK OF THAT AND HAVE THAT INFORMATION ON HAND FOR THE COMPANY'S OWN PURPOSES, BUT ALSO AGAIN IT GOES TO THE BIG PICTURE OF HOW THE COMPANY IS EXERCISING THEIR DUE DILIGENCE AND IF THEY ARE DOING -- MAKING THE RIGHT KIND OF DECISIONS ABOUT SITING IN THE BEGINNING AND CONSULTING WITH

THE SERVICE AND IMPLEMENTING
THE RIGHT KIND OF SURVEYS AND
MONITORING AND MOST IMPORTANT
LINK FROM OUR PERSPECTIVE
ADAPTIVE MANAGEMENT WHEN THEY
IDENTIFY A PROBLEM IT'S NOT JUST
ABOUT COUNTING UP BIRD BODIES
ARE REPORTING INCIDENTS, IT'S
ABOUT DOING SOMETHING TO FIX THE
PROBLEM.

THAT'S ULTIMATELY WHAT IT COMES
DOWN TO FROM A LAW
ENFORCEMENT STANDPOINT.
WHAT IS REASONABLE FOR A
COMPANY TO DO TO AVOID TAKE AND
THEN WHEN PROBLEMS ARE
IDENTIFIED, TO FIX THAT TAKE.
SO AGAIN REPORTING IS NOT
ABSOLUTELY REQUIRED BUT
CERTAINLY ENCOURAGED.

>>CHRISTY JOHNSON-HUGHES:
ABSOLUTELY.

AND SPECIAL PURPOSE UTILITY WHAT
DOES THAT MEAN?

>> THAT'S FOR INDUSTRY AND
THERE'S ONE AVAILABLE FOR WIND
AS WAS THE OTHER INDUSTRIES AND
SPECIFIC FOR THE TYPE OF
INDUSTRY THEY COVER.

>>CHRISTY JOHNSON-HUGHES:
GREAT.

THANK YOU.

JERRY DID YOU HAVE ANYTHING YOU
WANTED TO ADD?

>> CHILL BROUGHT UP THE GOOD
POINT OF THE PERMIT FOR HANDLING
NOT REALLY A WAY TO REPORT OR
DOCUMENT FATALITIES SO I THINK
THAT IS A GOOD POINT AND THERE IS
ONE VENUE, THERE ARE PLACES WE
ARE STARTING TO SEE THIS
INFORMATION COMPILED AND THAT'S
ONE OF THE THINGS WITH THEIR
RESEARCH INFORMATION SYSTEM IS
WE TALK ABOUT ADAPTIVE

MANAGEMENT BUT IF WE DON'T GET THE DATA TO LOOK AT THE SITUATION THAT'S WHERE SOME SITUATIONS OF OPPORTUNITIES LIKE THAT WHERE VON INTERIOR REPORTING HAVE BEEN USED TO HELP THE INDUSTRY IN GENERAL.

>>CHRISTY JOHNSON-HUGHES: FISH AND WILDLIFE SERVICE IS TRYING TO PUT TOGETHER A MORE ROBUST DATABASE SO THAT WE CAN USE THAT INFORMATION OR AT LEAST PUT IT INTO CONTEXT SO WE KNOW WHETHER IT CAN BE USED FOR FATALITY ESTIMATES OR A GENERAL SENSE OF WHAT MIGHT BE GOING ON. THAT'S SOMETHING WE ARE WORKING ON.

AMERICAN WIND WILDLIFE INSTITUTE, WE KNOW PEOPLE ARE READING THESE VERY QUICKLY AND WHERE DO YOU SEE THESE ACRONYMS.

SO HERE IS A QUESTION THAT WE HAVE SEEN BEFORE, OIL AND GAS HAS BEEN HELD ACCOUNTABLE FOR VIOLATIONS UNDER THE MIGRATORY BIRD TREATY ACT WENT WILL WIN THE FACILITIES TO HELP TO THE SAME STANDARD?

I WILL GO BACK TO JOE FOR THIS QUESTION.

>> I'VE HEARD THAT QUESTION BEFORE.

LAW ENFORCEMENT HAS VIRTUALLY THE SAME APPROACH WITH ALL INDUSTRY AND THAT IS -- THIS IS SOMETHING WE'VE DONE FOR YEARS AND IT'S BEEN PUT INTO OFFICIAL LAW ENFORCEMENT POLICY, WE PROVIDE NOTICE TO A COMPANY WHEN A PROBLEM IS IDENTIFIED OR A PROBLEM IS ANTICIPATED WE PUT THE COMPANY A NOTICE AND LET THEM KNOW WHAT LAWS ARE IMPLICATED AND WE ENCOURAGE

COMPLIANCE IN THAT NOTICE AND THEN WE PROVIDE THEM AN OPPORTUNITY TO CORRECT THE PROBLEM.

AGAIN IN SOME INDUSTRIES LIKE OIL AND GAS, IT'S EASIER TO DO.

SO WE HAVE A PATTERN OF DEALING WITH OIL AND GAS WHERE WE LET THEM KNOW THERE'S A PROBLEM.

FOR EXAMPLE, A. OPEN PITS THAT NEED TO BE NETTED AND WE PROVIDE THEM NOTICE AND GIVE THEM TIME TO FIX THE PROBLEM BEFORE WE GO OUT AND TAKE ENFORCEMENT ACTION.

THAT IS OUR APPROACH WITH INDUSTRY IN GENERAL.

AGAIN GETTING BACK TO WIND, THE DIFFICULTY IS THERE ARE LIMITED OPPORTUNITIES TO CORRECT.

COMPANIES DON'T LIKE THE ONES THAT ARE REALLY ON THE TABLE WHICH IS CURTAILMENT, SHUT DOWN OR MOVING THE TURBINES.

SO AGAIN, GETTING BACK TO THE WHOLE IMPORTANCE OF PICKING THE RIGHT SITE AND PUTTING THE RIGHT DESIGN TO A WIND FACILITY IS SO IMPORTANT AND CONSULTING WITH THE SERVICE EARLY ON IS SO IMPORTANT BECAUSE WHEN WE GET TO THE POINT WHERE LAW ENFORCEMENT GETS INVOLVED WITH WIND TAKE, -- TAKE A PROTECTED SPECIES, IT'S A LOT MORE DIFFICULT FOR THEM AND A LOT MORE EXPENSIVE QUITE FRANKLY BUT WE ARE ACTIVELY INVESTIGATING SOME WIND FARMS OUT THERE AND WE ARE VERY NEAR HAVING OUR FIRST CASE CHARGED.

SO IT'S NOT THAT WE ARE TREATING THEM DIFFERENTLY IT'S JUST A LOT MORE DIFFICULT.

THE ADMINISTRATIVE RECORD TAKES

A LONG TIME TO PUT TOGETHER FOR US TO DECIDE WHICH COMPANIES NEED TO BE CRIMINALLY PROSECUTED.

WE WANT TO MAKE SURE WE'VE GOT THE WHOLE COMPLETE PICTURE AND THAT IS TIME-CONSUMING AND TAKEN A WHILE, BUT WE ARE ALMOST THERE.

>>CHRISTY JOHNSON-HUGHES: IT'S NOT A VERY STRAIGHTFORWARD THING LIKE YOU SAID.

THEY'RE VERY US CONSIDERATIONS THAT COME INTO PLAY AND THAT INCLUDES THE RELATIONSHIP WITH THE COMPANY AND WHAT THE CIRCUMSTANCES ARE.

BUT I THINK THE REAL TAKE AWAY HERE IS WE ARE NOT TREATING WIND ANY DIFFERENTLY THEN ANY OTHER INDUSTRY IT'S JUST WE HAVE A LONGER HISTORY WITH OIL AND GAS AND WIND IS RELATIVELY NEW AT THIS SCALE AND WE ARE STILL LEARNING WHAT HAPPENS WITH WIND.

SO IT IS JUST WHERE WE ARE ON THE LANDSCAPE.

ALL RIGHT, TAKING ANOTHER QUESTION, DO THE POST- CONSTRUCTION AND RECOMMENDATION IN COULD RISK ASSESSMENT OF ANY NEW ELECTRIC TRANSMISSION LINES THAT MAYBE PART OF THE WIND PROJECT?

JEFF, I WOULD LIKE TO THROW THIS QUESTION OVER TO YOU.

HOW DO YOU VIEW THIS?

>> OVERWHELMINGLY, YES.

VERY FEW NEW WIND FACILITIES ARE LOCATED IMMEDIATELY ADJACENT TO A SUBSTATION OR TRANSMISSION LINE THEY COULD TIE INTO SOME MOST PROJECTS WE ARE INVOLVED IN REVIEWING AT THE MOMENT TO

HAVE SOME CRITICAL
INFRASTRUCTURE TRANSMISSION
LINES AND TO SOME EXTENT
DISTRIBUTION LINES ASSOCIATED
WITH THEM.
IN SOME CASES THEY ALSO INVOLVE
A SUBSTATION AS WELL.
TYING BACK TO WHAT WE WERE
DISCUSSING EARLIER THERE ARE
DIRECT AND INDIRECT HABITAT
ASSESSMENTS OR HABITAT IMPACTS
FROM THOSE NEW FEATURES ON THE
LANDSCAPE.

AS FAR AS THE RISK ASSESSMENT
GOES, THE FISH IN MY LIFE SERVICE
DOES RECOMMEND THAT NEW
TRANSMISSION LINES ASSOCIATED
WITH THE NEW PROJECT ARE
IMPLEMENTED WITH THE LATEST AND
GREATEST RECOMMENDATIONS
FROM THE COMMITTEE.

JERRY I MIGHT ASK YOU TO
ELABORATE ON THAT A LITTLE BIT
BUT BEFORE WE GO THERE, IN MANY
CASES, NEW PROJECTS ARE
DEVELOPED WITH FEDERAL LAND
NEXUS AND THAT TRIGGERS A
VARIETY OF IMPACT ASSESSMENTS.
THINGS LIKE IF YOU ARE BUILDING A
NEW PROJECT ON BML GROUNDED
THERE'S A TRANSMISSION LINE
RUNNING THROUGH THAT THEY
CONSULT WITH THE SERVICE ON THE
TRANSMISSION LINE AND
EVERYTHING ASSOCIATED WITH IT.

>>CHRISTY JOHNSON-HUGHES:
OKAY.

THANK YOU AND JERRY, SINCE THIS
WAS THROWN A LITTLE BIT IN YOUR
CORNER, DO YOU HAVE ANYTHING
YOU'D LIKE TO ADD?

>> THE COMMITTEE HAS A LONG
HISTORY OF DEALING WITH THE
DISTRIBUTION LINES AND THE
POTENTIAL ELECTROCUTION AND THE

TRANSMISSION LINES THEY HAVE
DOCUMENTED GUIDANCE PROVIDED
ON COLLISION FACTORS.

SO THERE IS SOME VALUABLE
RESOURCES THERE THAT COULD BE
GAINED FROM THIS INFORMATION.

>>CHRISTY JOHNSON-HUGHES:

THANK YOU.

THIS LOOKS LIKE ANOTHER ONE FOR
YOU JILL.

ASIDE FOR CRIMINAL PROSECUTION
AND RESTITUTION ARE THERE
ALTERNATIVE MECHANISMS IN PLACE
SUCH AS UPFRONT MITIGATION AND
THEN ACTUAL BIRD MORTALITY?

SO I SENT THIS OVER TO YOU JILL BUT
CRIMINAL PROSECUTION

ALTERNATIVE MECHANISMS AND
THAT'S WHEN WE START GETTING
INTO MITIGATION AND I ALMOST FEEL
LIKE THOSE ARE TWO DIFFERENT
SIDES OF THE ISSUE.

I WILL THROW THIS TO YOU, BUT THEN
MAYBE GOING OVER TO JEFF AS
WELL.

>> SURE.

WHAT I WOULD SAY TO ANY COMPANY
THAT'S ASKING A QUESTION ABOUT
WHAT CAN THEY DO TO LESSEN
THEIR LIABILITY AT WHATEVER POINT
THEY ARE IN THEIR DEVELOPMENT OR
OPERATION, WAITING FOR CRIMINAL
PROSECUTION TO HAPPEN IS NOT
GOING TO BE YOUR BEST ACTION.

IF YOU KNOW YOU HAVE A PROBLEM,
THE BEST THING TO DO IS COME INTO
THE SERVICE AND IDENTIFY THE
PROBLEM, TRY TO WORK WITH THE
SERVICE TO RESOLVE THE END DOWN
THE ROAD FOR WIND, THAT POINT
WILL BE MORE PAINFUL THAN IT
WOULD BE UPFRONT BUT IT'S BETTER
TO ADDRESS THE PROBLEM AND TRY
TO RESOLVE IT THAN TO WAIT FOR
CRIMINAL PROSECUTION BECAUSE

WITH PROSECUTION THERE ARE FINES, RESTITUTION, POTENTIAL JAIL TIME DEPENDING ON THE CIRCUMSTANCES BUT WHAT WE ARE ALL AFTER HERE IS FIXING THE PROBLEM.

AVOIDING IT IDEALLY BUT FIXING IT ONCE IT'S BEEN IDENTIFIED SO THE COMPANY GETS IN FRONT OF THAT AND DOES EVERYTHING THEY CAN TO FIX THE PROBLEM, THEY MAY AVOID CRIMINAL PROSECUTION.

SO I WOULD ENCOURAGE ANY COMPANY THAT HAS A PROBLEM, KNOWS IT AND IS NOT SURE WHAT TO DO THE BEST THING THEY CAN DO IS BRING IT FORWARD AND ADDRESS IT. FIX THE PROBLEM.

>>CHRISTY JOHNSON-HUGHES: THAT'S A GREAT PERSPECTIVE THEN I WANT TO TAKE YOUR THOUGHT FURTHER AND SAY THIS IS ALSO PART OF THAT ADAPTIVE MANAGEMENT. BUT ALSO IDENTIFYING SOME OF THOSE OPPORTUNITIES BEFORE YOU EVEN GET THERE.

SOME OF THOSE MITIGATION OPPORTUNITIES SO THAT AGAIN WE ALL KNOW WHAT SOME OF OUR ACTIONS MIGHT BE IF AN UNEXPECTED EVENTS HAPPENS. SO JEFF, WHEN THEY TALK ABOUT UPFRONT MITIGATION FOR MODEL THAN ACTUAL BIRD MORTALITY IS, YOU'VE PUT TOGETHER SOME PLANS THAT INCLUDED THIS.

CAN YOU DESCRIBE FOR US SOME OF THESE UPFRONT MITIGATION OPPORTUNITIES?

>> SURE.

IN KIND OF A NUTSHELL, ONCE YOU HAVE A CONCEPT WORKING THROUGH THE FIRST COUPLE TIERS OF THE IMPACT YOUR PROJECT IS LIKELY TO HAVE NOT DEFINITELY

WILL HAVE BUT REASONABLY
FORESEEABLE IMPACT YOU CAN
BEGIN TO ADVANCE MITIGATION TO
OFFSET THOSE IMPACTS BEFORE THE
PROJECT IS EVEN ON THE
LANDSCAPE.

AND THEREFORE, WE PASS A LITTLE
BIT -- WE HAVE AN EASIER TIME
PASSING BEEN NO NET LOSS
CONCEPT WHERE THE EFFECTS OF A
PROJECT TEND TO BE PRETTY
IMMEDIATE ON THE LANDSCAPE AND
RELATIVELY LONG-TERM AND IT'S
NICE TO SEE MITIGATION PACKAGES
PUT FORTH ON THE LANDSCAPE THAT
ARE EQUALLY RESILIENT AND
LONG-LASTING ON THE LANDSCAPE
AND COMPARABLE TO WHAT WE
THINK THE IMPACTS MIGHT BE.
WE GET INTO A LOT MORE DETAIL
WITH THIS WHEN WE DISCUSSED
EAGLE PERMITTING AND EAGLE LOSS
AND EAGLE TAKE UNDER THE BALD
EAGLE PROTECTION ACT AND IT'S A
SUBJECT OF ADDITIONAL FUTURE
WIND ENERGY BROADCASTS I HOPE.
BUT WHEN IT COMES TO THINGS LIKE
DIRECT HABITAT LOSS, OR EVEN
QUANTIFYING INDIRECT HABITAT
LOSS, THERE'S A VARIETY OF TOOLS
AVAILABLE TO HELP DO THAT WHICH
INFORMED THAT MITIGATION
PROPOSAL THAT IDEALLY WOULD BE
IN PLACE BEFORE THE IMPACT OF
THE PROPOSED PROJECT TAKE
PLACE.

>> IF I COULD ADD TO THAT, JEFF
MAKES A GREAT POINT ABOUT THE
BENEFIT THAT WE CAN GET UPFRONT
AND THE MORE THAT'S DONE TO
OFFSET IMPACT, THE BETTER.
I DO HAVE TO POINT OUT THAT
UNLESS AND UNTIL SUCH TIME AS WE
HAVE MIGRATORY BIRD TREATY ACT
TAKE PERMITS THERE'S NOT AN

OFFICIAL ACT LIKE THERE IS UNDER THE EAGLE TAKE ACT SO WE ENCOURAGE COMPANIES TO OFFSET A MINIMIZE THEIR TAKE OF MIGRATORY BIRDS BUT THERE IS NO OFFICIAL MITIGATION PROCESS UNDER MBTA LIKE THERE IS UNDER THE EAGLE PROTECTION ACT.

>>CHRISTY JOHNSON-HUGHES: I'D LIKE TO MOVE ONTO ANOTHER QUESTION.

THE FISH AND WILDLIFE SERVICE HAS TALKED ABOUT DEVELOPING INCIDENTAL TAKE REGULATIONS FOR THE MIGRATORY BIRD TREATY ACT FOR YEARS.

ANY PROGRESS OR PLANS TO DO THIS?

WE DO NOT HAVE A REPRESENTATIVE FROM THE PROGRAM HERE WITH US TODAY AND THEY WOULD BE THE PROGRAM IN THE FISH AND WILDLIFE SERVICE THAT WOULD HANDLE A TAKE PERMITS UNDER THE MIGRATORY BIRD TREATY ACT WHAT I DO UNDERSTAND IS THIS IDEA HAS BEEN FLOATED IN FISH AND WILDLIFE SERVICE AND IT HAS BEEN DISCUSSED BUT NO DECISIONS HAVE BEEN MADE AT THIS POINT IN TIME SO WE DON'T HAVE ANY FURTHER INFORMATION TO GIVE YOU ON THAT.

ALL RIGHT SO YOU KNOW JERRY, I THINK THIS NEXT QUESTION WOULD BE GOOD FOR YOU, IS MOVING WIND TURBINES CONSIDERED FEASIBLE?

>> I'VE NOT SEEN A JOHN DEERE YOU COULD HOOK UP TO TURBINES THAT COULD MOVE IT.

THAT WAS SORT OF A JUST.

BUT THAT ASIDE, IT'S FEASIBLE, BUT IT COMES DOWN TO THE PARTICULAR CIRCUMSTANCES AND SITUATIONS.

I THINK JILL ALLUDED TO THERE IS A SERIES OF FACTORS ONE COULD

UTILIZE ASSOCIATE WITH A PARTICULAR TURBINE AND IF THERE IS A REASON IT HAS AN ISSUE, LOOKING AT WHAT WE CALL A ADAPTIVE MANAGEMENT OR ROOT CAUSE ANALYSIS, WHAT FACTORS ARE GOING ON AT THAT PARTICULAR TURBINE THAT IS CREATING AN ISSUE. WE BUILD THEM.

YOU CAN DEFINITELY DECOMMISSION A TURBINE THAT IS A VERY REALISTIC?

I WOULD THINK THERE'S A WHOLE SERIES OF OTHER OPTIONS ONE COULD CONSIDER FIRST.

>>CHRISTY JOHNSON-HUGHES: I THINK YOU ARE RIGHT.

USUALLY MOVING A TURBINE IS NOT WHAT WE ARE LOOKING AT.

MOVING IT IT MAY JUST BE HAVING IT NON-OPERATIONAL.

OR ALTERING IT SO THAT -- AND THAT IS PART OF CURTAILMENT AS USED IN THE WIND ENERGY GUIDELINES BECAUSE THAT TERM HAS BEEN DEFINED MULTIPLE WAYS BUT, CHANGING THE SPEED AT WHICH THE BLADES BEGIN TO SPIN OR HAVING IT IN BREAK MODE OR SLOWING DOWN THE SPIN SO IT IS JUST FREEWHEELING DURING MIGRATION EVENTS.

THOSE ARE OPERATIONAL MODIFICATIONS THAT CAN BE MADE TO REDUCE THE IMPACT AND LIKE YOU SAID, ALL OF THOSE WOULD PROBABLY BE CONSIDERED WHILE BEFORE DECOMMISSIONING OF THE ACTUAL TURBINE.

>> ANOTHER THING WITH THE INDUSTRY OF THE RESEARCH GOING ON WITH BCI, AWWI AND OTHERS DETERRENTS ARE BEING LOOKED AT AND A WHOLE SERIES OF THINGS THAT ARE BEING EXAMINED THAT

MIGHT BE IN THE FUTURE THAT WOULD ALLOW FOR ENHANCING THAT OPERATION SO I THINK THAT RELOCATION OR MOVING IS VERY LOW ON THE TOTEM POLE.

>> AT THE BOTTOM OF YOUR LIST OF PREFERRED WAYS TO DEAL WITH IT BUT IF THE PROBLEM WERE SIGNIFICANT ENOUGH AND THE COMPANY SHOULD KNOW BETTER THAN TO PUT THE TURBINE THERE AND WHATEVER THE TAKE ISSUE IS TO TAKE IT DOWN THEN THAT MAYBE THE ONLY SOLUTION AND IF WE COULD NOT COME TO THAT AGREEMENT WITH A COMPANY IN THE WORST CASE SCENARIO A JUDGE COULD VERY WELL ORDER THAT. IT WOULD BE THE EXTREME MEASURE, BUT IT COULD HAPPEN.

>>CHRISTY JOHNSON-HUGHES: THAT'S A GOOD POINT JAIL AND THERE MAY BE SITUATIONS THERE THAT ARE EXTREME HOPEFULLY WE AVOID THEM AND THAT'S THE WHOLE POINT OF THE GUIDELINE IS WE DO NOT GET TO THAT POINT WHERE THE CIRCUMSTANCES ARE THAT EXTREME.

SO LET'S MOVE ON TO ANOTHER QUESTION, WHETHER RELATED MASS TURBINE FATALITIES CAN BE MITIGATED BY CURTAILMENT NOT DAYS OR MONTHS BUT A MATTER OF HOURS.

SHOULD WE THEN CONDUCT TIER FIVE RESEARCH TO STUDY THE WEATHER WIND TURBINE MASS FATALITY INTERACTION.

AND ABSOLUTELY.

FROM WHAT I UNDERSTAND THEIR EFFORTS TO LOOK AT WHETHER A FENCE AND HOW THEY CAN INFLUENCE THE MOVEMENT OF SPECIES THROUGH THE AIR AND WE

HAVE SEEN CORRELATIONS WITH VARIOUS WEATHER ELEMENTS, BUT WE ARE STILL REFINING THAT INFORMATION FROM WHAT I UNDERSTAND. SO IT'S NOT THAT IT'S NOT BEING DONE. WE ARE STILL LEARNING ABOUT IT AND THERE ARE SO MANY ELEMENTS TO BE TAKEN INTO CONSIDERATION BUT JERRY HAS IBERDROLA LOOKED AT WHETHER AND FATALITIES IN WIND TURBINE INTERACTION?

>> WE ARE LOOKING AT FOR EXAMPLE, VISIBILITY HAS SHOWN TO BE A MAJOR CONCERN AND USING VISIBILITY IS AN OPERATING PARAMETER AND THEN WHEN YOU LOOK AT AGAIN BACK CONSERVATION INTERNATIONAL AND SOME THINGS WITH USGS, THERE'S A SIGNIFICANT AMOUNT OF RESEARCH GOING ON TRYING TO LOOK AT THIS AS A PREDICTIVE ASPECT AND HOW IT CAN FACILITATE OR OPTIMIZE OPERATIONS WHILE REDUCING THE POTENTIAL FATALITIES. SO A LOT OF THINGS HAPPENING IN THAT REGARD.

>>CHRISTY JOHNSON-HUGHES: EXCELLENT. THANK YOU.

JEFF DID YOU HAVE ANYTHING TO ADD TO THAT?

>> THERE IS A REALLY GOOD EXAMPLE OF AN OPPORTUNITY FOR THE COMMUNICATION TO WORK BACK AND FORTH BETWEEN THE PROJECT DIRECTORS AND FISH THEM WHILE LIFE SERVICE. IN MANY CASES THEY WILL DEVELOP SEVERAL YEARS OF PRE- AND PROJECT WEATHER DATA THROUGH THE TOWERS AND THAT DATA SET CAN BE VERY VALUABLE IN TERMS OF

PREDICTING THINGS LIKE WEATHER
EVENTS THAT MAY IMPACT
MIGRATION ROUTES OR SOMETHING
LIKE THAT.

IDEALLY, A LOT OF THIS INFORMATION
ARE THE KINDS OF THINGS WE
GATHER IN TIER 1 AND TIER TWO AND
TIER 3 AS WELL.

A LOT OF THE MIGRATING CORRIDORS
USING MIGRATION AS AN EXAMPLE
WHEN COMBINED WITH THE WEATHER
IS SENT CAN PRESCRIBE MITIGATION
IN TERMS OF HOURS VERY SPECIFIC
TIMELINES ARE CIRCUMSTANCES
RATHER THAN DAYS OR SOMETHING
LIKE THAT.

A LOT OF THE WHETHER OFFENSE
THAT ARE USED BY THE SPECIES
THAT ARE MIGRATING ARE ALSO
OVERLAPPED WITH GEOGRAPHIC
FEATURES WHETHER IT'S BAT
MIGRATING DOWN WHEREVER
CORRIDORS OR EAGLES OR RAPTORS
MIGRATING DURING THE DAY DOWN
CLIFF EDGES WHERE THEY TAKE A
BANDAGE OF THE THERMALS AND
THAT KIND OF THING SO TYPICALLY A
LOT OF INFORMATION AVAILABLE TO
HELP US MAKE THE INFORMED
DECISIONS ON THE FRONT-END THAT
CAN BE USED TO TAILOR AND CRAFT
MITIGATION OR THINGS LIKE
CURTAILMENT TO VERY SPECIFIC
EVENTS THAT ARE NOT AS EXTREME
AS A MONTHLONG SHUTDOWN OR
SOMETHING LIKE THAT.

>>CHRISTY JOHNSON-HUGHES:
OKAY.

I THINK YOU ARE RIGHT.

WE ARE MOVING IN THE DIRECTION
OF HAVING MORE KNOWLEDGE THAT
WE CAN APPLY AND APPLY IT VERY
SPECIFICALLY.

AND MORE ACCURATELY.

AND I THINK THAT IS TERRIFIC.

AGAIN, IT LEADS BACK TO THE UTILITY OF THE TIER FIVE RESEARCH PROJECT WHICH WE DON'T HAVE TIME TO GET INTO BUT THAT INFORMATION HAS FED IN AS WELL TO THE SPECIFIC INFORMATION ABOUT A SPECIFIC PROJECT IN A VERY PARTICULAR LOCATION.

SO THANK YOU VERY MUCH.

WE HAVE ONE LAST QUESTION, I'M NOT SURE IF WE CAN ANSWER QUICKLY BUT LET'S GIVE IT A SHOT. HAVE SOME STUDY SHOWED THAT MIGRATORY FLIGHTS ARE LESS LIKELY TO TAKE PLACE DURING BAD WEATHER, FALLING BAROMETRIC PRESSURE.

QUICKLY, JEFF AND JERRY, DO YOU HAVE ANY?

>> I THINK WE MIGHT BEST ANSWER THAT AFTER IN A WRITTEN FORM. I'M NOT SURE WHAT THE RIGHT ANSWER WOULD BE FOR THAT.

>>CHRISTY JOHNSON-HUGHES: IT COULD WELL BE PART OF ANOTHER WIND ENERGY BROADCAST THAT INCLUDES THE LATEST ON RESEARCH.

SO, WITH THAT WHAT I WOULD LIKE TO DO IS ASK OUR GROUP AND THE LAST OBSERVATIONS OR RECOMMENDATIONS THAT THEY WOULD LIKE TO SHARE AND I WOULD LIKE TO START WITH YOU JEFF. YOU HAVE ANYTHING YOU'D LIKE TO SHARE?

>> I WILL STEAL EVERYBODY'S THUNDER WHEN I RECOMMEND WE ALL CONTINUE TO COMMUNICATE EARLY AND OFTEN.

>>CHRISTY JOHNSON-HUGHES: THAT IS A POPULAR TERM.

>> IT WORKS.

>>CHRISTY JOHNSON-HUGHES: JERRY, HOW ABOUT YOURSELF?

>> DOCUMENT AND DEMONSTRATE.
BUT, THE ONE THING I WOULD THROW
OUT IS THE LONG-TERM ASPECT WE
REALLY DO NEED TO LOOK AT ONE
ASPECT WIND ENERGY GUIDELINES
DOES NOT COVER IS THE
LONGER-TERM MONITORING AND
ASSESSING WHAT THE EFFECTS
MIGHT BE AN LOOKING AT THE
OPPORTUNITIES TO DO INCIDENTAL
OR SYSTEMATIC OBSERVATIONS WITH
UTILIZING OPERATIONS PERSONNEL.
>>CHRISTY JOHNSON-HUGHES: ALL
RIGHT.
THAT IS FAIR.
WORDS TO TALK ABOUT.
AND JILL, YOUR FINAL THOUGHTS.
>> I WOULD SAY FROM OUR
PERSPECTIVE IS VERY IMPORTANT
COMPANIES NOT ONLY HAVE THE
COMMUNICATION AND SHARE
INFORMATION, BUT THEY ACTUALLY
IMPLEMENT THE SERVICES
RECOMMENDATIONS.
THAT'S WHAT WE LOOK FOR WHEN
WE LOOK AT THE ADMINISTRATIVE
RECORD IF THEY'VE DONE
EVERYTHING THEY SHOULD HAVE TO
AVOID TAKE THAN THE LIKELIHOOD
THEY WILL FACE A LAW
ENFORCEMENT INVESTIGATION AND
POTENTIAL PROSECUTION IS VERY
LOW.
AND THE LAST THING I WOULD ADD IS
IF THERE ARE PERMITS AVAILABLE,
THEY SHOULD APPLY.
COMPANY SHOULD APPLY FOR THEM.
I WILL THROW THIS OUT FOR THOSE
IN EAGLE COUNTRY, DON'T WAIT
UNTIL YOU KILL AN EAGLE.
START WITH YOUR EGO
CONSERVATION PLAN SOONER
RATHER THAN LATER AND APPLY FOR
AN EAGLE TAKE PERMIT.
THEY ARE AVAILABLE AND IF YOU

DON'T APPLY THAT'S AN AWFUL
LOT -- AND UNLAWFUL TAKE THAT
WILL BE TAKEN SERIOUS.

>>CHRISTY JOHNSON-HUGHES: WE
WILL TALK MORE ABOUT THAT.
THANK YOU AGAIN FOR JOINING US
TODAY WITH OUR THIRD WIND
ENERGY BROADCAST.

LIKE I SAID, WE HOPE TO HAVE
ANOTHER WIND ENERGY BROADCAST
IN JANUARY OR FEBRUARY.

YOU WILL BE NOTIFIED OF THE DATE.
OF COURSE, THIS WILL BE ARCHIVED
ON OUR WEBSITE ALONG WITH ALL OF
THE RESOURCES THAT WE
MENTIONED DURING THIS
BROADCAST AN ADDITIONAL BASIC
LEARNING POINTS.

THANK YOU FOR JOINING US TODAY.